1 INTRODUCTION

1.1 Background

The U.S. Nuclear Regulatory Commission (NRC) prepared this Draft Environmental Impact Statement (Draft EIS) in response to an application submitted by Louisiana Energy Services (LES), for a license to construct, operate, and decommission a gas centrifuge uranium enrichment facility near Eunice in Lea County, New Mexico (Figure 1-1). The proposed facility is referred to as the National Enrichment Facility (NEF).

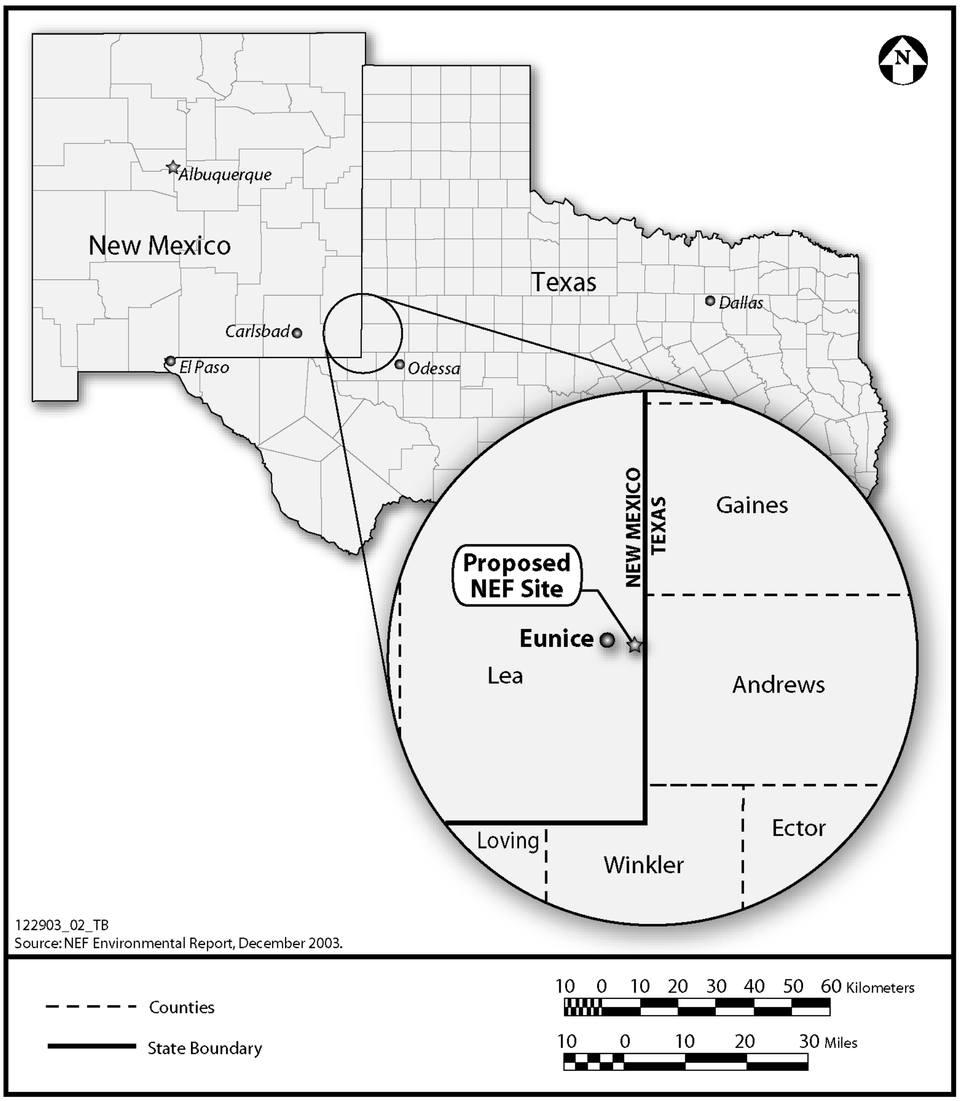

Figure 1-1 Location of the Proposed National Enrichment Facility (LES, 2004)

The NRC's Office of Nuclear Material Safety and Safeguards and its consultants Advanced Technologies and Laboratories International, Inc., and Pacific Northwest National Laboratory prepared this Draft EIS in accordance with Title 10, "Energy," of the *U.S. Code of Federal Regulations* (10 CFR) Part 51, which implements the requirements of the *National Environmental Policy Act of 1969* (NEPA), as amended (Public Law 91-190). This Draft EIS assesses the potential environmental impacts of the proposed action.

1.2 The Proposed Action

The LES proposed action considered in this Draft EIS is to construct, operate, and decommission a uranium enrichment facility referred to as NEF at a site near the city of Eunice, in Lea County, New Mexico. The proposed NEF would produce enriched uranium-235 (^{235}U) up to 5 weight percent by the gas centrifuge process. The enriched uranium would be used in commercial nuclear power plants. Uranium enrichment is a step in the nuclear fuel cycle (Figure 1-2) in which natural uranium is converted and fabricated so it can be used as nuclear fuel in commercial nuclear power plants. The proposed NEF would not alter the total amount of enriched uranium used in the U.S. nuclear fuel cycle because the amount of enriched uranium produced at the proposed NEF would only substitute for enriched uranium from other sources.

Uranium ore usually contains approximately 0.72 weight percent ^{235}U, and this percentage is significantly less than the 3 to 5 weight percent ^{235}U enrichment required by nuclear power plants as fuel for electricity generation. Therefore, uranium must be enriched. Enrichment is the process of increasing the percentage of the naturally occurring and fissionable ^{235}U isotope and decreasing the percentage of uranium-238 (^{238}U).

The nominal production capacity of the proposed NEF would be 3 million separative work units (SWUs) per year. A SWU is a measure of enrichment in the uranium enrichment industry, and it represents the level of effort or energy required to raise the concentration of ^{235}U to a specified level.

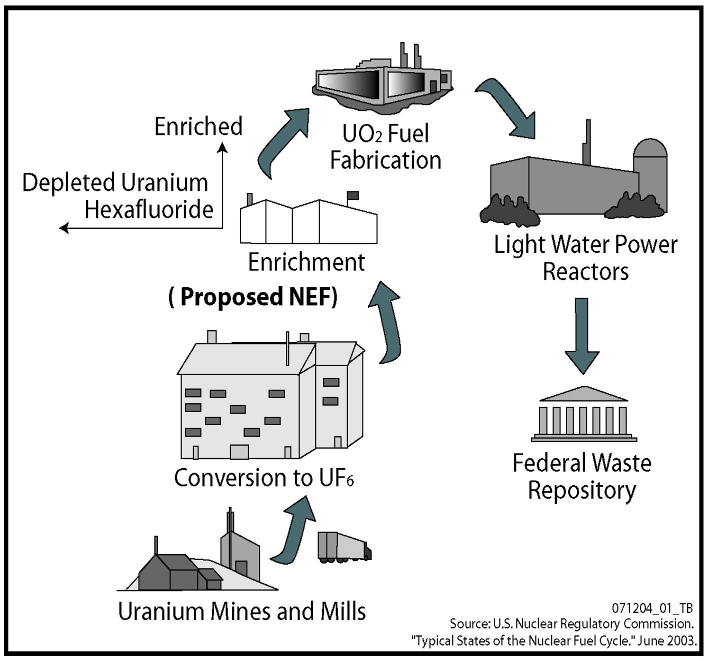

Figure 1-2 Nuclear Fuel Cycle (NRC, 2003c)

The proposed NEF would be licensed in accordance with the provisions of the *Atomic Energy Act*. Specifically, the proposed NEF would require an NRC license under 10 CFR Parts 30, 40, and 70 that would authorize the proposed NEF to possess and use special nuclear material, source material, and byproduct material.

1.3 Purpose and Need for the Proposed Action

The proposed action is intended to satisfy the need for an additional reliable and economical domestic source of enrichment services. The proposed NEF would contribute to the attainment of the national energy security policy objectives. The Administration's energy policy, which was released in May 2001, called the expansion of nuclear energy dependence "a major component of our national energy policy" (NEP, 2001).

Nuclear power plants are currently supplying approximately 20 percent of the Nation's electricity requirements (EIA, 2003a). Of the 11.5 million SWUs that were purchased by U.S. nuclear reactors in 2002, only about 1.7 million SWUs—or 15 percent—were provided by enrichment plants located in the United States (EIA, 2003b). In 2003, the domestic enrichment services provided 14 percent of the total 12 million SWUs purchased (EIA, 2004a).

Over the past 50 years, several uranium enrichment facilities have been used in the United States, including the gaseous diffusion plants near Portsmouth, Ohio (herein referred to as the Portsmouth Gaseous Diffusion Plant), and Paducah, Kentucky (herein referred to as the Paducah Gaseous Diffusion Plant). Both plants are operated by the United States Enrichment Corporation (USEC), only the Paducah Gaseous Diffusion Plant currently remains in operation (USEC, 2003). The end of enriched uranium production at the Portsmouth Gaseous Diffusion Plant in May 2001 has led to reliability risks of U.S. domestic enrichment supply capability. In addition, the Highly Enriched Uranium Agreement deliveries[1] provide for additional U.S. enrichment product. This Agreement is scheduled to expire in 2013. A supply disruption associated with the Paducah Gaseous Diffusion Plant production or the Highly Enriched Uranium Agreement deliveries could impact national energy security because domestic commercial reactors would be fully dependent on foreign sources for enrichment services.

In a 2002 letter to the NRC, the U.S. Department of Energy (DOE) indicated that domestic uranium enrichment had fallen from a capacity greater than domestic demand to a level that was less than half of domestic requirements (DOE, 2002). In this letter, DOE:

- Referenced those interagency discussions led by the National Security Council where there was a clear determination that the United States should maintain a viable and competitive domestic uranium enrichment industry for the foreseeable future.

- Estimated that 80 percent of projected demand for nuclear power in 2020 could be fueled from foreign sources.

- Noted the importance of promoting the development of additional domestic enrichment capacity to maintain a viable and competitive domestic uranium enrichment industry for the foreseeable future.

- Noted that there was sufficient domestic demand to support multiple uranium enrichment facilities and that competition is important to maintain a healthy industry, and encouraged the private sector to invest in new uranium enrichment capacity.

- Indicated its support for the deployment of Urenco gas centrifuge technology in the U.S. market by expressing its support for Urenco to partner with a U.S. company or companies, transferring Urenco's technology to new U.S. commercial uranium enrichment facilities.

Forecasts of installed nuclear-generating capacity suggest a continuing demand for uranium enrichment services both in the United States and abroad. Table 1-1 shows the uranium enrichment requirements in the United States for the next two decades as forecasted by LES (LES, 2004) and the Energy Information

[1] The United States Enrichment Corporation (USEC) implements the 1993 government-to-government agreement between the United States and Russia that calls for Russia to convert 500 metric tons (550 tons) of highly enriched uranium from dismantled nuclear warheads into low-enriched uranium. This is the equivalent of about 20,000 nuclear warheads. USEC purchases the enrichment portion of the blended-down material and sells it to its electric utility customers for fuel in their commercial nuclear power plants. This Agreement is also known as Megatons to Megawatts (USEC, 2004a).

Administration (EIA, 2003c). These two forecasts of uranium enrichment requirements were generally consistent. However, LES projections were adjusted for plutonium recycled in the mixed oxide fuel that would use plutonium oxide and uranium oxide mixture as fuel. DOE is planning to convert approximately 34 metric tons (37.5 tons) of surplus plutonium from nuclear weapons into a nuclear fuel comprised of a mixture of plutonium and uranium oxides, called MOX fuel, for use in selected commercial nuclear power plants (NRC, 2003d). Therefore, the LES projections tended to be slightly lower than the Energy Information Administration forecast. Annual enrichment services requirements in the United States are forecasted to be 11.4 to 14.2 million SWUs in 2025. The two forecasts indicate a need for additional uranium enrichment capability to ensure national energy security.

Table 1-1 Projected Uranium Enrichment Demand in the United States for 2002–2025 in Million SWUs

Year	LES Projections[a]	EIA Projections[b]
2002	11.5	11.5 (actual)[c]
2005	11.6	14.6
2010	11.8	12.9
2015	11.4	15.4
2020	11.4	13.5
2025	Not Provided	14.2

EIA - Energy Information Agency.
SWU - Separative Work Unit.
[a] LES, 2004.
[b] EIA, 2003c.
[c] EIA, 2003b.

The domestic enrichment services would be used in the production of nuclear fuel for commercial nuclear power reactors. By 2020, the United States would need about 393 gigawatts or 393,000 megawatts of new generating capacity (DOE, 2003). Installed nuclear-generating capacity in the United States is projected to increase from approximately 98 gigawatts (98,000 megawatts) in 2001 to about 103 gigawatts (103,000 megawatts) in 2025. This increase includes the uprating of existing plants equivalent to 3.9 gigawatts (3,900 megawatts) of new capacity (EIA, 2004b). This projection, including uprates, would increase U.S. nuclear capacity by more than 5 gigawatts (5,000 megawatts), the equivalent of adding about five large nuclear power reactors. As of March 2004, the NRC has granted 92 uprates and is reviewing 8 uprate applications (NRC, 2004b). In addition, domestic nuclear facilities reported a record high median 3-year design electrical rating capacity factor of 89.66 percent for the period 2001–2003 as compared to 70.78 percent for the period 1989–1991 (Blake, 2004).

USEC provides approximately 56 percent of the U.S. enrichment market needs (USEC, 2004c) with the remaining 44 percent supplied by foreign sources. These enrichment supplies encompass the enrichment products from its enrichment operation at the energy-intensive Paducah Gaseous Diffusion Plant (USEC, 2004a; NRC, 2004a) and the Highly Enriched Uranium Agreement deliveries from Russia, which expires in 2013 (USEC, 2002; USEC, 2004b). The current trend for domestic enrichment services is to develop more efficient, modern, and less costly means to operate enrichment facilities. The gas centrifuge technology for uranium enrichment is known to be more efficient and require less energy to operate than the gaseous diffusion technology currently in use in the United States (NRC, 2004a). On January 12, 2004, USEC announced plans to build and operate a uranium enrichment plant (known as the American Centrifuge Plant) in Piketon, Ohio. This plant

How Much Is a Megawatt?

One megawatt roughly provides enough electricity for the demand of 400–900 homes. The actual number is based on the season, time of day, region of the country, power plant capacity factors, and other factors.

Source: Bellemare, 2003.

would cost up to $1.5 billion, employ up to 500 people, and reach an initial annual production level of 3.5 million SWUs by 2010 (USEC, 2004b).

Purchasers of enrichment services view diversity and security of supply as vital from a commercial perspective (LES, 2004). The proposed NEF would supplement the domestic sources of enrichment services provided by USEC's Paducah Gaseous Diffusion Plant and the proposed American Centrifuge Plant. Beginning production in 2008 and achieving full production output by 2013, the proposed NEF would provide roughly 25 percent of the current and projected U.S. enrichment services demand (EIA, 2004a; EIA, 2003b).

> ***The NRC Environmental and Safety Reviews***
>
> *The focus of an Environmental Impact Statement (EIS) is a presentation of the environmental impacts of the proposed action.*
>
> *In addition to meeting its responsibilities under the National Environmental Policy Act (NEPA), the NRC prepares a Safety Evaluation Report (SER) to analyze the safety of the proposed action and assess its compliance with applicable NRC regulations.*
>
> *The safety and environmental reviews are conducted in parallel. Although there is some overlap between the content of a SER and an EIS, the intent of the documents is different.*
>
> *To aid in the decision process, the EIS provides a summary of the more detailed analyses included in the SER. For example, the EIS does not address how accidents are prevented; rather, it addresses the environmental impacts that would result should an accident occur.*
>
> *Much of the information describing the affected environment in the EIS also is applicable to the SER (e.g., demographics, geology, and meteorology).*
>
> *Source: NRC, 2003b; NRC, 2002*.

1.4 Scope of the Environmental Analysis

To fulfill its responsibilities under NEPA, the NRC has prepared this Draft EIS to analyze the environmental impacts of the LES proposal as well as reasonable alternatives to the proposed action. The scope of this Draft EIS includes consideration of both radiological and nonradiological (including chemical) impacts associated with the proposed action and the reasonable alternatives. The Draft EIS also addresses the potential environmental impacts relevant to transportation.

This Draft EIS addresses cumulative impacts to physical, biological, economic, and social parameters. In addition, this Draft EIS identifies resource uses, monitoring, potential mitigation measures, unavoidable adverse environmental impacts, the relationship between short-term uses of the environment and long-term productivity, and irreversible and irretrievable commitments of resources.

The development of this Draft EIS is the result of the NRC staff's review of the LES license application and the Environmental Report. This review has been closely coordinated with the development of the Safety Evaluation Report (SER) being prepared by the NRC to evaluate, among other aspects, the health and safety impacts of the proposed action. The SER is the outcome of the NRC safety review of the LES license application and Safety Analysis Report.

1.4.1 Scoping Process and Public Participation Activities

The NRC regulations in 10 CFR Part 51 contain requirements for conducting a scoping process prior to the preparation of an EIS. Scoping was used to help identify those issues to be discussed in detail and those issues that are either beyond the scope of this EIS or are not directly relevant to the assessment of potential impacts from the proposed action.

On February 4, 2004, the NRC published in the *Federal Register* (69 FR 5374) a Notice of Intent to prepare an EIS for the construction, operation, and decommissioning of the proposed NEF and to conduct the scoping process for the EIS. The Notice of Intent set forth in Appendix A summarized the NRC's plans to prepare the EIS and presented background information on the proposed NEF. For the scoping process, the Notice of Intent invited comments on the proposed action and announced a public scoping meeting to be held concerning the project.

On March 4, 2004, the NRC staff and its consultants, Advanced Technologies and Laboratories International, Inc., and Pacific Northwest National Laboratory toured the site and held a scoping meeting in Eunice, New Mexico. During the scoping meeting, a number of individuals offered oral and written comments and suggestions to the NRC concerning the proposed NEF and the development of the EIS. In addition, the NRC received written comments from various individuals during the public scoping period that ended on March 18, 2004. The NRC carefully reviewed and identified individual comments (both oral and written). These comments were then consolidated and categorized by topical areas.

After the scoping period, the NRC distributed the *Scoping Summary Report: Proposed Louisiana Energy Services National Enrichment Facility, Lea County, New Mexico* (Appendix A) in April 2004. The *Scoping Summary Report* identified categories of issues to be analyzed in detail and issues beyond the scope of the EIS.

1.4.2 Issues Studied in Detail

As stated in the Notice of Intent, the NRC identified issues to be studied in detail as they relate to implementation of the proposed action. The public identified additional issues during the subsequent public scoping process. All the issues that have identified by the NRC and the public could have short- or long-term impacts from the potential construction and operation of the proposed NEF. These issues are:

- Public and worker health.
- Need for the facility.
- Alternatives.
- Waste management.
- Depleted uranium disposition.
- Water resources.
- Geology and soils.
- Compliance with applicable regulations.
- Air quality.
- Transportation.
- Accidents.
- Land use.
- Socioeconomic impacts.
- Noise.
- Visual and scenic resources.
- Cost/benefits.
- Environmental justice.
- Cultural resources.
- Resource commitments.
- Ecological resources.
- Decommissioning.
- Cumulative impacts.

1.4.3 Issues Eliminated from Detailed Study

The NRC has determined that detailed analysis for mineral resources was not necessary because there are no known nonpetroleum mineral resources at the proposed site that would be affected by any of the alternatives being considered. In addition, detailed analysis of the impact of the proposed NEF on connected actions that include the overall nuclear fuel cycle activities were not considered. The proposed NEF would not measurably affect the mining and milling operations and the demand for enriched uranium. The amount of mining and milling is dependent upon the stability of market prices for uranium balanced with the concern of environmental impacts associated with such operations (NRC, 1980). The demand for enriched uranium in the United States is primarily driven by the number of commercial nuclear power plants and their operation. The proposed NEF will only result in the creation of new transportation routes within the fuel cycle to and from the enrichment facility. The existing transportation routes between the other facilities are not expected to be altered. Because the environmental impacts of all of the transportation routes other than those to and from the proposed NEF have been previously analyzed, they are eliminated from further study (NRC, 1980; NRC, 1977).

1.4.4 Issues Outside the Scope of the EIS

The following issues were identified during the scoping process to be outside the scope of the EIS:

- Nonproliferation.
- Public scoping process.
- Safety and security.

A summary of the scoping process is contained in Appendix A.

1.4.5 Related NEPA and Other Relevant Documents

The following NEPA documents were reviewed as part of the development of this Draft EIS to obtain information related to the issues raised.

- *Final Environmental Impact Statement for the Construction and Operation of Claiborne Enrichment Center, Homer, Louisiana. NUREG-1484, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, August 1994.* This EIS was developed to analyze the environmental consequences for the construction, operation, and decommissioning of a uranium enrichment facility in Claiborne, Louisiana, by LES. The proposed facility, which was never constructed, was based on a similar technology to that proposed for Lea County, New Mexico. Due to the similarities in technology and facilities, the impacts resulting from implementing the proposed action in Lea County could be compared to those estimated for the Claiborne facility.

- *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride. DOE/EIS-0269, Office of Nuclear Energy, Science and Technology, U.S. Department of Energy, April 1999.* This EIS analyzes strategies for the long-term management of the depleted uranium hexafluoride (DUF_6) inventory currently stored at three DOE sites near Paducah, Kentucky; Portsmouth, Ohio; and Oak Ridge, Tennessee. This EIS also analyzes the potential environmental consequences of implementing each alternative strategy for the period from 1999 through 2039. The results presented in this EIS are relevant to the management, use, and potential impacts associated with the DUF_6 that would be generated at the proposed NEF.

- *Final Environmental Impact Statement for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Paducah, Kentucky, Site. DOE/EIS-0359, Oak Ridge Operations, Office of Environmental Management, U.S. Department of Energy, June 2004.* This site-specific EIS considers the construction, operation, maintenance, and decommissioning of the proposed DUF_6 conversion facility at three locations within the Paducah, Kentucky, site, which is a DOE facility; transportation of DUF_6 conversion products and waste materials to a disposal facility; transportation and sale of the hydrogen fluoride produced as a conversion co-product; and neutralization of hydrogen fluoride to calcium fluoride and its sale or disposal in the event that the hydrogen fluoride product is not sold. The results presented in this EIS are relevant to the management, use, and potential impacts associated with the DUF_6 that would be generated at the proposed NEF.

- *Final Environmental Impact Statement for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Portsmouth, Ohio, Site. DOE/EIS-0360, Oak Ridge Operations, Office of Environmental Management, U.S. Department of Energy, June 2004.* This site-specific EIS analyzes the construction, operation, maintenance, and decommissioning of the proposed DUF_6 conversion facility at three alternative locations within the Portsmouth, Ohio, site; transportation of all cylinders (DUF_6, enriched uranium, and empty) currently stored at the East Tennessee Technology Park near Oak Ridge, Tennessee, to Portsmouth; construction of a new cylinder storage yard at Portsmouth (if required) for cylinders from the East Tennessee Technology Park; transportation of DUF_6 conversion products and waste materials to a disposal facility; transportation and sale of the hydrogen fluoride produced as a conversion co-product; and neutralization of hydrogen fluoride to calcium fluoride and its sale or disposal in the event that the hydrogen fluoride product is not sold. The results presented in this EIS are relevant to the management, use, and potential impacts associated with the DUF_6 that would be generated at the proposed NEF.

- *Environmental Assessment: Disposition of Russian Federation Titled Natural Uranium. DOE/EA-1290, Office of Nuclear Energy, Science and Technology, U.S. Department of Energy, June 1999.* This Environmental Assessment analyzed the environmental impacts of transporting natural UF_6 from the gaseous diffusion plants to the Russian Federation. Transportation by rail and truck were considered. The Environmental Assessment addresses both incident-free transportation and transportation accidents. The results presented in this Environmental Assessment are relevant to the transportation of UF_6 for the proposed NEF.

1.5 Applicable Regulatory Requirements

This section provides a summary assessment of major environmental requirements, agreements, Executive Orders, and permits relevant to the construction, operation, and decommissioning of the proposed NEF.

1.5.1 Federal Laws and Regulations

1.5.1.1 *National Environmental Policy Act of 1969,* as amended (42 U.S.C. § 4321 et seq.)

NEPA establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment to ensure for all Americans a safe, healthful, productive, and aesthetically and culturally pleasing environment. NEPA provides a process for implementing these specific goals within the Federal agencies responsible for the action. This Draft EIS has been prepared in accordance with NEPA requirements and NRC regulations (10 CFR Part 51) for implementing NEPA.

1.5.1.2 *Atomic Energy Act of 1954,* as amended (42 U.S.C. § 2011 et seq.)

The *Atomic Energy Act*, as amended, and the *Energy Reorganization Act of 1974* (42 U.S.C. § 5801 et seq.) give the NRC the licensing and regulatory authority for nuclear energy uses within the commercial sector. If the license application for the proposed NEF is approved, the NRC would license and regulate the possession, use, storage, and transfer of byproduct, source, and special nuclear materials to protect public health and safety as stipulated in 10 CFR Parts 30, 40, and 70.

1.5.1.3 *Clean Air Act,* as amended (42 U.S.C. § 7401 et seq.)

The *Clean Air Act* establishes regulations to ensure air quality and authorizes individual States to manage permits. The *Clean Air Act*: (1) requires the Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards as necessary to protect the public health, with an adequate margin of safety, from any known or anticipated adverse effects of a regulated pollutant (42 U.S.C. § 7409 et seq.); (2) requires establishment of national standards of performance for new or modified stationary sources of atmospheric pollutants (42 U.S.C. **§** 7411); (3) requires specific emission increases to be evaluated so as to prevent a significant deterioration in air quality (42 U.S.C. **§** 7470 et seq.); and (4) requires specific standards for releases of hazardous air pollutants (including radionuclides) (42 U.S.C. **§** 7412). These standards are implemented through plans developed by each State with EPA approval. The *Clean Air Act* requires sources to meet standards and obtain permits to satisfy those standards and to meet air-quality standards and obtain permits to satisfy those standards. The proposed NEF may be required to comply with the *Clean Air Act* Title V, Sections 501–507, for sources subject to new source performance standards or sources subject to National Emission Standards for Hazardous Air Pollutants.

1.5.1.4 *Clean Water Act,* as amended (33 U.S.C. § 1251 et seq.)

The *Clean Water Act* requires the EPA to set national effluent limitations and water-quality standards, and establishes a regulatory program for enforcement. Specifically, Section 402(a) of the Act establishes water-quality standards for contaminants in surface waters. The *Clean Water Act* requires a National Pollutant Discharge Elimination System (NPDES) permit before discharging any point source pollutant into U.S. waters. EPA Region 6 administers this program with an oversight review by the New Mexico Environment Department/Water Quality Bureau. The NPDES General Permit for Industrial Stormwater is required for point source discharge of stormwater runoff from industrial or commercial facilities to State waters. Construction of the proposed NEF would require an NPDES Construction Stormwater General Permit from EPA Region 6 and an oversight review by the New Mexico Environment Department/Water Quality Bureau. Section 401(a)(1) of the *Clean Water Act* requires States to certify that the permitted discharge would comply with all limitations necessary to meet established State water-quality standards, treatment standards, or schedule of compliance.

1.5.1.5 *Resource Conservation and Recovery Act,* as amended (42 U.S.C. § 6901 et seq.)

The *Resource Conservation and Recovery Act* (RCRA) requires the EPA to define and identify hazardous waste; establish standards for its transportation, treatment, storage, and disposal; and require permits for persons engaged in hazardous waste activities. Section 3006 of the RCRA (42 U.S.C. **§** 6926) allows States to establish and administer these permit programs with EPA approval. EPA Region 6 has delegated regulatory jurisdiction to the New Mexico Environment Department/Hazardous Waste Bureau for nearly all aspects of permitting as required by the *New Mexico Hazardous Waste Act*. The EPA regulations implementing the RCRA are found in 40 CFR Parts 260 through 283. Regulations imposed on a generator or on a treatment, storage, and/or disposal facility vary according to the type and quantity of material or waste generated, treated, stored, and/or disposed. The method of treatment, storage, and/or disposal also impacts the extent and complexity of the requirements. The proposed NEF would generate small quantities of hazardous waste that are expected to be not greater than 100 kilograms (220 pounds) per month. There would be no plans to store these wastes in excess of 90 days; thus, the proposed NEF would qualify as a small quantity hazardous waste generator in accordance with Section 20.4.1 of the *New Mexico Administrative Code* and would be in compliance with RCRA requirements.

1.5.1.6 *Low-Level Radioactive Waste Policy Act of 1980,* as amended (42 U.S.C. § 2021 et seq.)

The *Low-Level Radioactive Waste Policy Act of 1980* amended the *Atomic Energy Act* to specify that the Federal Government is responsible for disposal of low-level radioactive waste generated by its activities and that States are responsible for disposal of other low-level radioactive waste. The *Low-Level Radioactive Waste Policy Act of 1980* provides for and encourages interstate compacts to carry out the State responsibilities. Low-level radioactive waste would be generated from activities conducted from the proposed NEF. The State of New Mexico is a member of the Rocky Mountain compact.

1.5.1.7 *Emergency Planning and Community Right-to-Know Act of 1986* (42 U.S.C. § 11001 et seq.) (also known as SARA Title III)

The *Emergency Planning and Community Right-to-Know Act of 1986*, which is the major amendment to the *Comprehensive Environmental Response, Compensation, and Liability Act* (42 U.S.C. § 9601*)*, establishes the requirements for Federal, State, and local governments; Indian tribes; and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals. The "Community Right-to-Know" provisions increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. States and communities working with facilities can use the information to improve chemical safety and protect public health and the environment. This Act requires emergency planning and notice to communities and government agencies concerning the presence and release of specific chemicals. The EPA implements this Act under regulations found in 40 CFR Parts 355, 370, and 372. This Act would require the proposed NEF to report on hazardous and toxic chemicals used and produced at the facility, and to establish emergency planning procedures in coordination with the local communities and government agencies.

1.5.1.8 *Safe Drinking Water Act,* as amended (42 U.S.C. § 300f et seq.)

The *Safe Drinking Water Act* was enacted to protect the quality of public water supplies and sources of drinking water. The New Mexico Environment Department/Water Quality Bureau, under 42 U.S.C. § 300g-2 of the Act, established standards applicable to public water systems. These regulations include maximum contaminant levels (including those for radioactivity) in public water systems. Other programs established by the *Safe Drinking Water Act* include the Sole Source Aquifer Program, the Wellhead Protection Program, and the Underground Injection Control Program. In addition, the Act provides underground sources of drinking water with protection from contaminated releases and spills (for example, implementing a Spill Prevention Control and Countermeasures Plan). The proposed NEF would not use onsite ground-water or surface-water supplies and would obtain potable water from nearby municipal water supply systems (i.e., the cities of Eunice and Hobbs, New Mexico). The proposed NEF is required to obtain a Ground Water Discharge Permit/Plan for the septic systems from the New Mexico Environment Department/Water Quality Bureau to comply with this Act.

1.5.1.9 *Noise Control Act of 1972,* as amended (42 U.S.C. § 4901 et seq.)

The *Noise Control Act* delegates the responsibility of noise control to State and local governments. Commercial facilities are required to comply with Federal, State, interstate, and local requirements regarding noise control. The proposed NEF is located in Lea County, which does not have a noise control ordinance.

1.5.1.10 *National Historic Preservation Act of 1966,* as amended (16 U.S.C. § 470 et seq.)

The *National Historic Preservation Act* (NHPA) was enacted to create a national historic preservation program, including the National Register of Historic Places and the Advisory Council on Historic Preservation. Section 106 of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties. The Advisory Council on Historic Preservation regulations implementing Section 106, found in 30 CFR Part 800, were revised on December 12, 2000 (65 FR 77697), and became effective on January 11, 2001. These regulations call for public involvement in the Section 106 consultation process, including Indian tribes and other interested members of the public, as applicable. The NRC has initiated the Section 106 consultation process to address the potential archaeological sites that have been identified on the proposed NEF site (see Section 1.5.6 and Appendix B).

1.5.1.11 *Endangered Species Act of 1973,* as amended (16 U.S.C. § 1531 et seq.)

The *Endangered Species Act* was enacted to prevent the further decline of endangered and threatened species and to restore those species and their critical habitats. Section 7 of the Act requires consultation with the U.S. Fish and Wildlife Service (FWS) of the U.S. Department of the Interior or the National Marine Fisheries Service of the U.S. Department of Commerce to determine whether endangered and threatened species or their critical habitats are known to be in the vicinity of the proposed action. The NRC has initiated the consultation process with the FWS for the proposed NEF (see Section 1.5.6 and Appendix B).

1.5.1.12 *Occupational Safety and Health Act of 1970,* as amended (29 U.S.C. § 651 et seq.)

The *Occupational Safety and Health Act* establishes standards to enhance safe and healthy working conditions in places of employment throughout the United States. The Act is administered and enforced by the Occupational Safety and Health Administration (OSHA), a U.S. Department of Labor agency. The identification, classification, and regulation of potential occupational carcinogens are found in 29 CFR § 1910.101, while the standards pertaining to hazardous materials are listed in 29 CFR § 1910.120. The OSHA regulates mitigation requirements and mandates proper training and equipment for workers. The proposed NEF would be required to comply with the requirements of these regulations.

1.5.1.13 *Hazardous Materials Transportation Act* (49 U.S.C. § 1801 et seq.)

The *Hazardous Materials Transportation Act* regulates transportation of hazardous material (including radioactive material) in and between States. According to the Act, states may regulate the transport of hazardous material as long as they are consistent with the Act or the U.S. Department of Transportation regulations provided in 49 CFR Parts 171-177. Title 49 CFR Part 173, Subpart I contains other regulations regarding packaging for transportation of radionuclides. Transportation of the depleted uranium cylinders from the proposed NEF would require compliance with the U.S. Department of Transportation regulations.

1.5.1.14 *Environmental Standards for Uranium Fuel Cycle* (40 CFR Part 190, Subpart B)

These regulations establish the maximum doses to the body or organs resulting from operational normal releases received by members of the public. These regulations were promulgated under the authority of the *Atomic Energy Act* of 1954, as amended. The proposed NEF would be required to comply with these regulations for its releases due to normal operations.

1.5.2 Applicable Executive Orders

- *Executive Order 11988* (Floodplain Management) directs Federal agencies to establish procedures to ensure that the potential effects of flood hazards and floodplain management are considered for any action undertaken in a floodplain and that floodplain impacts be avoided to the extent practicable.

- *Executive Order 12898* (Environmental Justice) requires Federal agencies to address environmental justice in minority populations and low-income populations (59 FR 7629), and directs Federal agencies to identify and address, as appropriate, disproportionately high and adverse health or environmental effects of their programs, policies, and activities on minority populations and low-income populations.

1.5.3 Applicable State of New Mexico Laws and Regulations

Certain environmental requirements, including some discussed earlier, have been delegated to State authorities for implementation, enforcement, or oversight. Table 1-2 provides a list of applicable State of New Mexico laws, regulations, and agreements.

Table 1-2 Applicable State of New Mexico Laws, Regulations, and Agreements

Law/Regulation/Agreement	Citation	Requirements
New Mexico Air Quality Control Act	NMSA, Chapter 74, “Environmental Improvement”, Article 2, “Air Pollution”, and implementing regulations in NMAC Title 20, Environmental Protection, Chapter 2, “Air Quality”	Establishes air-quality standards and requires a permit prior to construction or modification of an air-contaminant source. Also, requires an operating permit for major producers of air pollutants and imposes emission standards for hazardous air pollutants.
New Mexico Radiation Protection Act	NMSA, Chapter 74, Article 3, “Radiation Control”	Establishes State requirements for worker protection.
New Mexico Water Quality Act	NMSA, Chapter 74, Article 6, Water Quality, and implementing regulations found in NMAC Title 20, Chapter 6, “Water Quality”	Establishes water-quality standards and requires a permit prior to the construction or modification of a water-discharge source.

Law/Regulation/Agreement	Citation	Requirements
New Mexico Ground-Water Protection Act	NMSA, Chapter 74, Article 6B, “Ground-Water Protection”	Establishes State standards for protection of ground water from leaking underground storage tanks.
New Mexico Solid Waste Act	NMSA, Chapter 74, Article 9, *Solid Waste Act*, and implementing regulations found in NMAC Title 20, Environmental Protection, Chapter 9, “Solid Waste”	Requires a permit prior to construction or modification of a solid waste disposal facility.
New Mexico Hazardous Waste Act	NMSA, Chapter 74, Article 4, Hazardous Waste, and implementing regulations found in NMAC Title 20, Environmental Protection, Chapter 4, “Hazardous Waste”	Requires a permit prior to construction or modification of a hazardous waste disposal facility.
New Mexico Hazardous Chemicals Information Act	NMSA, Chapter 4, Article 4E-1, Hazardous Chemicals Information	Implements the hazardous chemicals information and toxic release reporting requirements of the *Emergency Planning and Community Right-to-Know Act of 1986* (SARA Title III) for covered facilities.
New Mexico Wildlife Conservation Act	NMSA, Chapter 17, Game and Fish, Article 2, Hunting and Fishing Regulations, Part 3, *Wildlife Conservation Act*	Requires a permit and coordination if a project may disturb habitat or otherwise affect threatened or endangered species.
New Mexico Raptor Protection Act	NMSA, Chapter 17, Articles 2–14	Makes it unlawful to take, attempt to take, possess, trap, ensnare, injure, maim, or destroy any species of hawks, owls, and vultures.
New Mexico Endangered Plant Species Act	NMSA, Chapter 75, Miscellaneous Natural Resource Matters, Article 6, Endangered Plants	Requires coordination with the State if a proposed project affects an endangered plant species.
Threatened and Endangered Species of New Mexico	NMSA Title 19, Natural Resources and Wildlife, Chapter 33, Endangered and Threatened Species 19.33.6.8	Establishes the list of threatened and endangered wildlife species.

Law/Regulation/Agreement	Citation	Requirements
Endangered Plant Species	NMAC Title 19, Chapter 21, Endangered Plants	Establishes endangered plant species list and rules for collection.
State Trust Lands Land Exchanges	NMAC Title 19, Chapter 21, Natural Resources and Wildlife	Establishes State standards and procedures for exchanges of lands held in trust, including consideration of cultural and natural resources and wildlife.
New Mexico Cultural Properties Act	NMSA, Chapter 18, Libraries and Museums, Article 6, Cultural Properties	Establishes State Historic Preservation Office and requirements to prepare an archaeological and historic survey and consult with the State Historic Preservation Office

NMSA - *New Mexico Statutes Annotated*
NMAC - *New Mexico Administrative Code.*
Source: LES, 2004; NMCPR, 2004; Conway, 2003.

1.5.4 Permit and Approval Status

Several construction and operating permit applications would be prepared and submitted, and regulator approval and/or permits would be received prior to construction or facility operation. Table 1-3 lists the required Federal, State, and local permits and their status.

Table 1-3 Required Federal, State, and Local Permits

Requirement	Agency	Comments/Status
Federal		
10 CFR Part 70, 10 CFR Part 40, 10 CFR Part 30	NRC	The proposed NEF license application is being reviewed.
NPDES General Permit for Industrial Stormwater	EPA Region 6	LES has the option of claiming "No Exposure" exclusion or filing for coverage under the Multi-Sector General Permit. A decision on the option to pursue is pending.
NPDES Construction Stormwater General Permit	EPA Region 6	LES may be required to develop a Stormwater Pollution Prevention Plan. This permit would not be required to be submitted until prior to the construction of the proposed NEF.
State		
Air Construction Permit	NMED/AQB	LES has filed a Notice of Intent with the AQB.

Requirement	Agency	Comments/Status
Air Operation Permit	NMED/AQB	An application is required 60 days before operations. LES has filed a Notice of Intent with the AQB.
NESHAP Permit	NMED/AQB	A NESHAP permit is not required because proposed NEF emissions would be below Federal and state regulatory limits.
Ground-Water Discharge Permit/Plan	NMED/WQB	This permit is required for industrial and septic discharges to evaporative retention/detention ponds/leach fields. The application has been submitted by LES to the WQB.
NPDES Industrial Stormwater	NMED/WQB	LES has the option of claiming "No Exposure" exclusion or filing for coverage under the Multi-Sector General Permit. A decision on the option to pursue is pending.
NPDES Construction Stormwater Permit	NMED/WQB	This permit requires the development of a Stormwater Pollution Prevention Plan. This permit would not be required to be submitted until prior to construction.
Hazardous Waste Permit	NMED/HWB	This permit is required to file a U.S. EPA Form 8700-12, Notification of Regulated Waste Activity. LES would be classified as a small quantity generator; therefore, no hazardous waste permit would be required.
EPA Waste Activity EPA ID Number	NMED/HWB	This number would be required for the DUF_6. This would be received after filing U.S. EPA Form 8700-12 in the hazardous waste permitting process.
Machine-Produced Radiation Registration (X-Ray Inspection)	NMED/RCB	Registration is required for security nondestructive inspection (x-ray) machines. The RCB has been notified that equipment will be registered, but registration would occur later in the regulatory process.
Rare, Threatened, & Endangered Species Survey Permit	NMDFG	This permit would only be required for conducting surveys of Bureau of Land Management lands. Surveys have been completed.
Right-of-Entry Permit	NMSLO	LES has obtained this permit for entry onto Section 32.

Requirement	Agency	Comments/Status
State Land Swap Arrangement	NMSLO	This arrangement requires that an environmental assessment and a cultural resources survey be conducted on lands offered for exchange. LES is evaluating different candidate properties. Once LES identifies properties to be offered for exchange, LES would purchase these properties and convey them to Lea County for reconveyance to the NMSLO.
Class III Cultural Survey Permit	NMSHPO	LES has obtained this permit to conduct surveys on Section 32.

NPDES - National Pollutant Discharge Elimination System; EPA - U.S. Environmental Protection Agency; NESHAP - National Emission Standards for Hazardous Air Pollutants; NMED/AQB - New Mexico Environment Department/Air Quality Bureau NMED/HWB - New Mexico Environment Department/Hazardous Waste Bureau; NMED/RCB - New Mexico Environment Department/Radiological Control Bureau; NMED/WQB - New Mexico Environment Department/ Water Quality Bureau; NMDGF - New Mexico Department of Game and Fish; NMSLO - New Mexico State Land Office; NMSHPO - New Mexico State Historic Preservation Office.
Source: LES, 2004.

1.5.5 Cooperating Agencies

During the scoping process, no Federal, State, or local agencies were identified as potential cooperating agencies in the preparation of this Draft EIS.

1.5.6 Consultations

As a Federal agency, the NRC is required to comply with the consultations requirements in the *Endangered Species Act of 1973*, as amended, and the *National Historic Preservation Act of 1966*, as amended.

1.5.6.1 *Endangered Species Act of 1973* Consultation

The NRC staff has initiated consultation with the FWS to comply with the requirements of Section 7 of the *Endangered Species Act of 1973* (Appendix B). On March 2, 2004, the NRC staff sent a letter to the FWS New Mexico Ecological Services Field Office describing the proposed action and requesting a list of threatened and endangered species and critical habitats that could potentially be affected by the proposed action. By letter dated March 26, 2004, the FWS New Mexico Ecological Services Field Office provided a list of threatened and endangered species, candidate species, and species of concern. Additional consultation with the FWS would be completed prior to issuance of the Final EIS to ensure that threatened or endangered species would be protected.

Additionally, by letter dated February 23, 2004, the State of New Mexico Department of Game and Fish, submitted scoping comments regarding the sand dune lizard and lesser prairie chicken, both of which are candidate species under the *Endangered Species Act*. The potential impacts of the proposed NEF on these species are addressed in Section 4.2.7 of Chapter 4 of this Draft EIS.

1.5.6.2 *National Historic Preservation Act of 1966* Section 106 Consultation

The NRC staff has offered State agencies, Federally recognized Indian tribes, and other organizations that may be concerned with the possible effects of the proposed action on historic properties an opportunity to participate in the consultation process required by Section 106 (see Appendix B). The following is a list of agencies, tribes, and organizations contacted during the ongoing consultation process:

New Mexico State Historic Preservation Office

By letter dated February 17, 2004, the NRC staff initiated the Section 106 consultation process with the State of New Mexico Department of Cultural Affairs, Historic Preservation Division, State Historic Preservation Office. This letter described the potentially affected area and requested **the views of the State Historic Preservation Office on further actions required to identify historic properties that may be affected. The NRC staff submitted a copy of the Cultural Resource Inventory for the proposed NEF to the State Historic Preservation Office, by letter dated March 29, 2004. The Cultural Resource Inventory is required by the NHPA** and 36 CFR Part 800 to locate and identify all potential prehistoric and historic properties that could be adversely affected by an undertaking. **On April 7, 2004, the NRC staff met with representatives from the State Historic Preservation Office and New Mexico State Land Office to discuss the proposed NEF and the Section 106 consultation process. The State Historic Preservation Office responded by letter dated April 26, 2004, summarizing the meeting and providing the following suggestions**:

- Enter into a Memorandum of Agreement (Agreement) that outlines agreed-upon measures that LES would undertake to mitigate the potential adverse effects of the proposed action on the historic properties located in the potentially affected area.

- Notify the Advisory Council on Historic Preservation that there would be adverse effects to cultural resources and notify and invite the Council to be a signatory to the Agreement.

- Contact Indian tribes and forward them a copy of the Cultural Resource Inventory.

- Consider several options for mitigating the adverse effects of the proposed action (see Appendix B).

Federally Recognized Indian Tribes

By letter dated February 17, 2004, the NRC staff initiated the Section 106 process with regional Federally recognized Indian tribes, soliciting their interest in being consulting parties in the Section 106 consultation process for the proposed project. In response to the State Historic Preservation Office's letter dated April 26, 2004, the NRC staff provided the Indian tribes with copies of the Cultural Resource Inventory and requested information regarding historic properties in the area of potential effects that could have cultural or religious significance to them. In addition, during the month of June, the NRC staff contacted the Indian tribes via telephone to discuss the requested information and to invite the Indian tribes to be concurring parties to the Agreement. The Mescalero Apache Tribe, by letter dated June 10, 2004, indicated the proposed NEF would not affect any sites or locations important to the tribe culture or religion. The Kiowa Tribe of Oklahoma, Comanche Tribe of Oklahoma, Mescalero Apache Tribe, and Yseleta del Sur Pueblo indicated they would like to be concurring parties to the Agreement. Subsequently, by letters dated July 6, 2004, the NRC staff provided a followup letter confirming the information provided in the above-mentioned telephone conversation or documenting attempts to contact the Mescalero Apache Tribe and the Apache Tribe of Oklahoma. As recommended by the State Historic Preservation Office, the NRC staff contacted Sam Cata, a Governor-appointed tribal liaison to discuss the project and determine which tribes should be contacted to comment on a treatment/mitigation plan. Project information was provided to Mr. Cata on June 4, 2004.

Other Organizations

Additionally, in accordance with 36 CFR § 800.3(f), the NRC staff contacted local organizations, by letter dated March 18, 2004, to solicit information on the proposed project.

Advisory Council on Historic Preservation

By letter dated June 24, 2004, the NRC staff notified the Council that the proposed action would result in an adverse effect on cultural resources and that an Agreement would be prepared.

1.6 Organizations Involved in the Proposed Action

Two organizations have specific roles in the implementation of the proposed action:

- LES is the NRC license applicant. If the license is granted, LES would be the holder of an NRC license for the construction, operation, and decommissioning of the proposed NEF. LES would be responsible for operating the proposed facility in compliance with applicable NRC regulations. LES is a Delaware limited partnership that was formed solely to provide uranium enrichment services for commercial nuclear power plants. LES has one, 100-percent-owned subsidiary operating as a limited liability company (LLC) that was formed for the purpose of purchasing industrial revenue bonds and has no organizational divisions. The LES general partners are Urenco Investments, Inc.[2], and Westinghouse Enrichment Company LLC[3]. The limited partners[4] are Urenco Deelnemingen B.V.; Westinghouse Enrichment Company LLC; Entergy Louisiana, Inc.; Claiborne Energy Services, Inc.; Cenesco Company LLC; and Penesco Company LLC. Urenco owns 70.5 percent of the partnership,

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[2] Urenco Investments, Inc., is a Delaware corporation and wholly owned subsidiary of Urenco Limited (Urenco), a corporation formed under the laws of the United Kingdom. Urenco is owned in equal shares by BNFL Enrichment Limited (BNFL-EL), Ultra-Centrifuge Nederland NV (UCN), and Uranit GmbH (Uranit) companies formed under English, Dutch, and German law, respectively. BNFL-EL is wholly owned by British Nuclear Fuels plc (BNFL), which is wholly owned by the Government of the United Kingdom. UCN is 99-percent owned by the Government of the Netherlands with the remaining 1 percent owned collectively by the Royal Dutch Shell Group, Koninklijke Philips Electronics N.V., and Stork N.V. Uranit is owned by Eon Kernkraft GmbH (50 percent) and RWE Power AG (50 percent), which are corporations formed under laws of the Federal Republic of Germany.

[3] Westinghouse Enrichment Company LLC is a Delaware limited liability company and wholly owned subsidiary of Westinghouse Electric Company (Westinghouse) LLC, a Delaware limited liability company whose ultimate parent (through two intermediary Delaware corporations and one corporation formed under the laws of the United Kingdom) is BNFL.

[4] Urenco Deelnemingen B.V. is a Netherlands corporation and wholly owned subsidiary of Urenco Nederlands B.V. (UNL); Westinghouse Enrichment Company LLC is a Delaware limited liability company, wholly owned by Westinghouse, that also is acting as a General Partner; Entergy Louisiana, Inc., is a Louisiana corporation and wholly owned subsidiary of Entergy Corporation, a publicly held Delaware corporation and a public utility holding company; Claiborne Energy Services, Inc., is a Louisiana corporation and wholly owned subsidiary of Duke Energy Corporation, a publicly held North Carolina corporation; Cenesco Company LLC is a Delaware limited liability company and wholly owned subsidiary of Exelon Generation Company LLC, which is a Pennsylvania LLC; Penesco Company LLC is a Delaware LLC and wholly owned subsidiary of Exelon Generation Company LLC.

while Westinghouse owns 19.5 percent of LES. The remaining 10 percent is owned by companies representing three U.S. electric utilities: Entergy Corporation, Duke Energy Corporation, and Exelon Generation Company LLC (LES, 2004).

LES has indicated that the principal business location is in Albuquerque, New Mexico. Furthermore, LES has stated that no other companies would be present or operating on the proposed NEF site other than services specifically contracted by LES (LES, 2004). The NRC intends to examine any foreign relationship to determine whether it is inimical to the common defense and security of the United States. The foreign ownership, control, and influence issue will be addressed as part of the NRC SER, and this issue is beyond the scope of this Draft EIS.

- The NRC is the licensing agency. The NRC has the responsibility to evaluate the license application for compliance with the NRC regulations associated with uranium enrichment facilities. These include standards for protection against radiation in 10 CFR Part 20 and requirements in 10 CFR Parts 30, 40, and 70 that would authorize LES to possess and use special nuclear material, source material, and byproduct material at the proposed NEF. The NRC is responsible for regulating activities performed within the proposed NEF through its licensing review process and subsequent inspection program. To fulfill the NRC responsibilities under NEPA, the environmental impacts of the proposed action are evaluated in accordance with the requirements of 10 CFR Part 51 and documented in this Draft EIS.

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2 ALTERNATIVES

This chapter describes the Louisiana Energy Services (LES) proposed action and reasonable alternatives including the no-action alternative. Related to the proposed action, the U.S. Nuclear Regulatory Commission (NRC) staff also examines alternatives for the disposition of the depleted uranium hexafluoride (DUF_6) material resulting from the enrichment operation over the lifetime of the proposed National Enrichment Facility (NEF). Under the no-action alternative, LES would not construct, operate, or decommission the proposed NEF. This alternative is included to comply with National Environmental Policy Act (NEPA) requirements. The no-action alternative provides a basis for comparing and evaluating the potential impacts of constructing, operating, and decommissioning the proposed NEF.

This chapter also addresses the site-selection process and reviews alternative enrichment technologies (other than the proposed centrifuge technology) and alternative sources for enriched product.

2.1 Proposed Action

The LES proposed action is the construction, operation, and decommissioning of the proposed NEF in southeastern New Mexico. Figure 2-1 shows the location of the proposed NEF.

The proposed action can be divided into three major activities: (1) site preparation and construction, (2) operation, and (3) decontamination and decommissioning.

The NRC license, if granted, would be for 30 years from the start of construction until completion of decommissioning.

Table 2-1 presents the current schedule for the proposed NEF project.

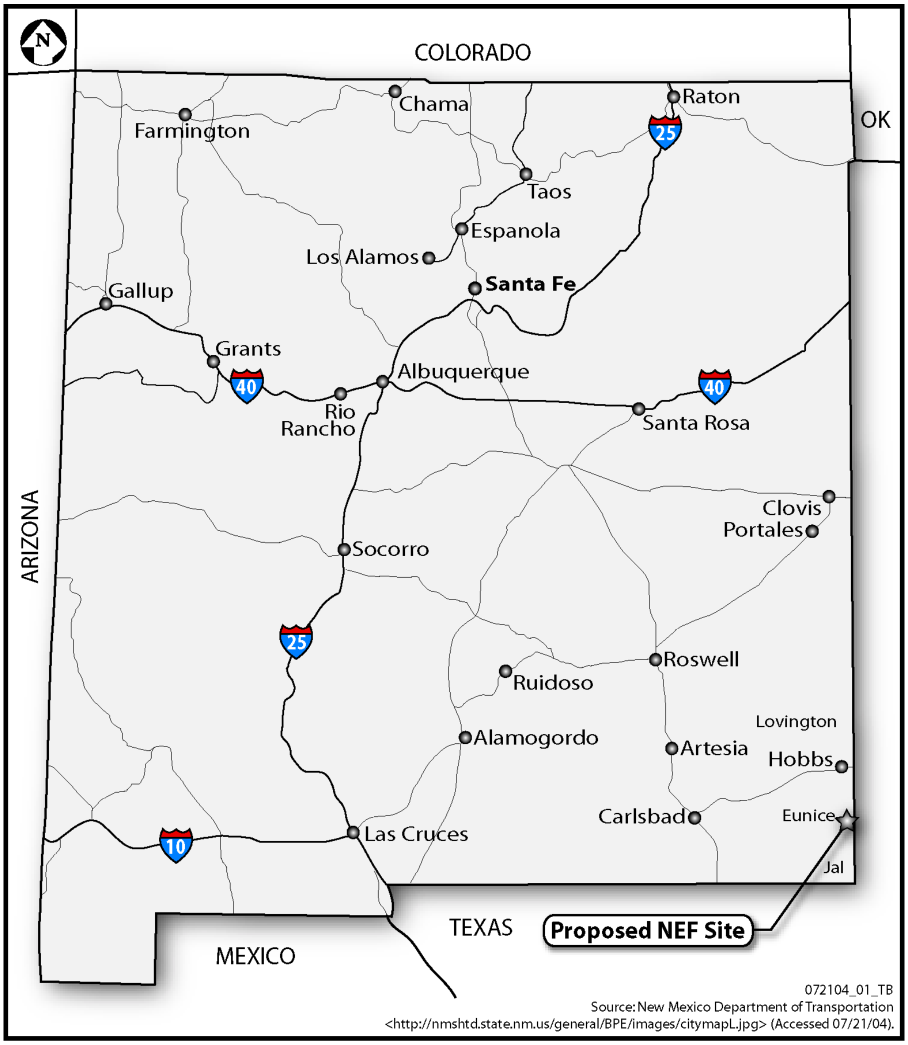


Figure 2-1 Location of Proposed NEF Site (NMDOT, 2004a)

Table 2-1 Proposed National Enrichment Facility Operation Schedule

Task	Start Date
Submit License Application to NRC	December 2003
Begin Construction of Facility	April 2006
Begin Operations of First Cascade	June 2008
Achieve Full Production Output	June 2013
Operate Facility at Full Capacity	June 2013 to June 2027
Submit Decommissioning Plan to NRC	April 2025
Begin Decommissioning of NEF	June 2027
Cease All Operations of Cascades	April 2033
Complete Decommissioning of Facility	April 2036

Source: LES, 2004a.

2.1.1 Location and Description of Proposed Site

The proposed NEF site consists of about 220 hectares (543 acres) located 8 kilometers (5 miles) east of the city of Eunice, New Mexico. The U.S. Bureau of Land Management (BLM) identifies the proposed site as Section 32 of range 38E in Township 21S of the New Mexico Meridian. The State of New Mexico currently owns the property; however, LES has been granted a 35-year easement (LES, 2004a). The entire site is undeveloped, with the exception of an underground carbon dioxide (CO_2) pipeline and a gravel road, and is used for cattle grazing. There is no permanent surface water on the site, and appreciable ground-water reserves are deeper than 340 meters (1,115 feet). The nearest permanent resident is 4.3 kilometers (2.6 miles) west of the proposed site near the junction of New Mexico Highway 234 and New Mexico Highway 18.

2.1.2 Gas Centrifuge Enrichment Process

The proposed NEF would employ a proven gas centrifuge technology for enriching natural uranium. Figure 2-2 shows the basic construction of a gas centrifuge. The technology uses a rotating cylinder (rotor) spinning at a high circumferential rate of speed inside a protective casing. The casing maintains a vacuum around the rotor and provides physical containment of the rotor in the event of a catastrophic rotor failure.

The uranium hexafluoride (UF_6) gas is fed through a fixed pipe into the middle of the rotor, where it is

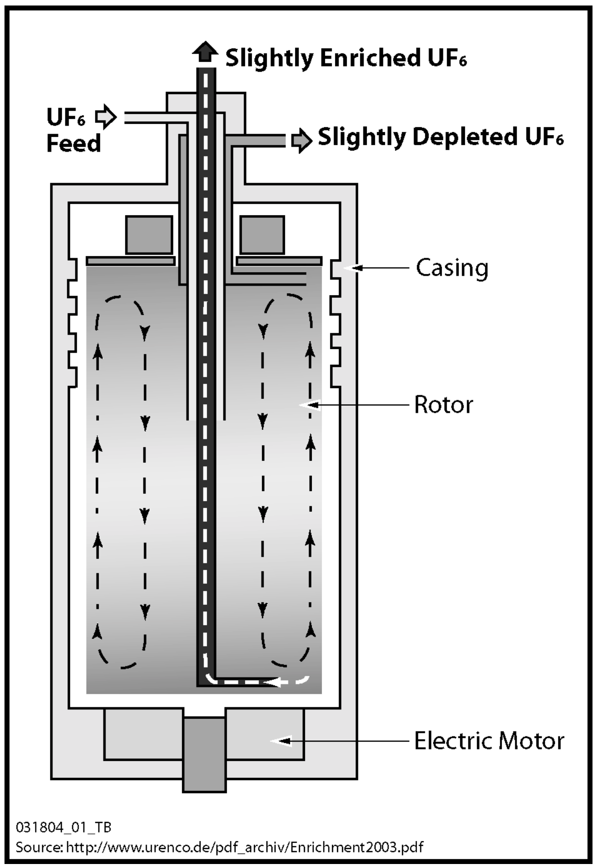


Figure 2-2 Schematic of a Gas Centrifuge (Urenco, 2003)

accelerated and spins at almost the same speed as the rotor. The centrifugal force produced by the spinning rotor causes the heavier uranium-238 hexafluoride ($^{238}UF_6$) molecules to concentrate close to the rotor wall and the lighter uranium-235 hexafluoride ($^{235}UF_6$) molecules collect closer to the axis of the rotor. This separation effect, which initially occurs only in a radial direction, increases when the rotation is supplemented by a convection current produced by a temperature difference along the rotor axis (thermoconvection). A centrifuge with this kind of gas circulation (i.e., from top to bottom near to the rotor axis and from bottom to top by the rotor wall) is called a counter-current centrifuge.

The inner and outer streams become more enriched/depleted in ^{235}U in their respective directions of movement. The biggest difference in concentration in a counter-current centrifuge does not occur between the axis and the wall of the rotor, but rather between the two ends of the centrifuge rotor. In the flow pattern shown in Figure 2-2, the enriched UF_6 is removed from the lower end and the DUF_6 at the upper end through take-off pipes that run from the axis close to the wall of the rotor.

The enrichment level achieved by a single centrifuge is not sufficient to obtain the desired concentration of 3 to 5 percent by weight of ^{235}U in a single step; therefore, a number of centrifuges are connected in series to increase the concentration of the ^{235}U isotope. Additionally, a single centrifuge cannot process a sufficient volume for commercial production, which makes it necessary to connect multiple centrifuges in parallel to increase the volume flow rate. The arrangement of centrifuges connected in series to achieve higher enrichment and parallel for increased volume is called a “cascade.” A full cascade contains hundreds of centrifuges connected in series and parallel. Figure 2-3 is a diagram of a segment of a uranium enrichment cascade showing the flow path of the UF_6 feed, enriched UF_6 product, and depleted uranium hexafluoride (DUF_6) gas. In the proposed NEF, eight cascades would be grouped in a Cascade Hall, and each separation building would house two cascade halls.

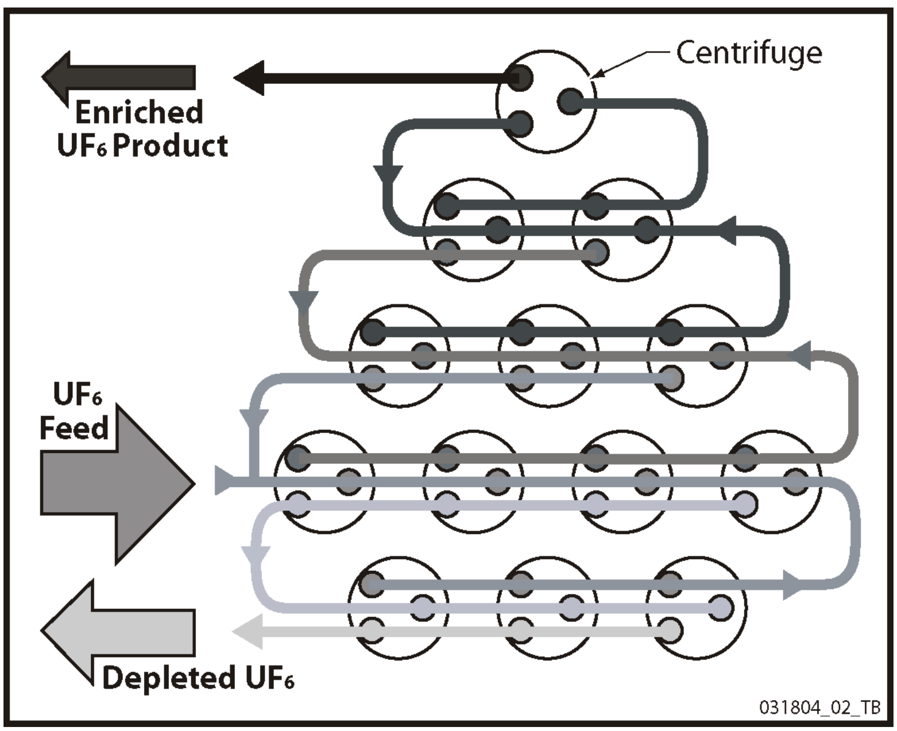


Figure 2-3 Diagram of Enrichment Cascade for Proposed NEF (Urenco, 2003)

What is enriched uranium?

Uranium is a naturally occurring radioactive element. In its natural state, uranium contains approximately 0.72 percent by weight of the uranium-235 isotope (^{235}U), which is the fissile isotope of uranium. There is a very small (0.0055 percent) quantity of the uranium-234 (^{234}U) isotope, and most of the remaining mass (99.27 percent) is the uranium-238 (^{238}U) isotope. All three isotopes are chemically identical and only differ slightly in their physical properties. The most important difference between the isotopes is their mass. This small mass difference allows the isotopes to be separated and makes it possible to increase (i.e., "enrich") the percentage of ^{235}U in the uranium to levels suitable for nuclear power plants or, at very high enrichment, nuclear weapons.

Most civilian nuclear power reactors use low-enriched uranium fuel containing 3 to 5 percent by weight of ^{235}U. Uranium for most nuclear weapons is enriched to greater than 90 percent.

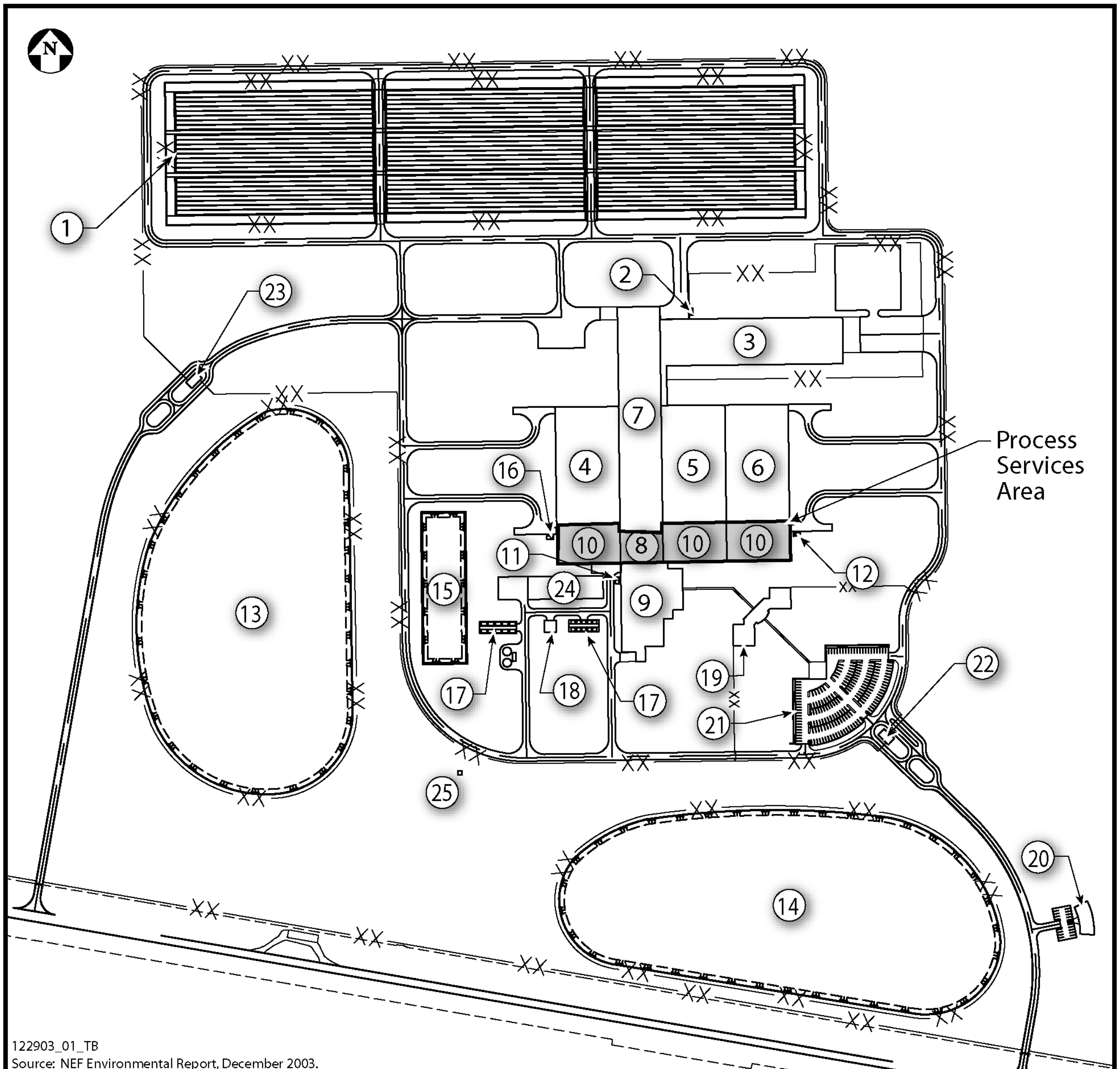
Uranium would arrive at the proposed NEF as natural UF_6 in solid form in a Type 48X or 48Y transport cylinder from existing conversion facilities in Port Hope, Ontario, Canada or Metropolis, Illinois. To start the enrichment process, the cylinder of UF_6 is heated, which causes the material to sublime (change directly from a solid to a gas). The UF_6 gas is fed into the enrichment cascade where it is processed to increase the concentration of the ^{235}U isotope. The UF_6 gas with an increased concentration of ^{235}U is known as "enriched" or "product." Gas with a reduced concentration of ^{235}U is referred to as "depleted" UF_6 (DUF_6) or "tails."

Source: WNA, 2003.

2.1.3 Description of Proposed National Enrichment Facility

Principal structures within the proposed NEF are shown in Figure 2-4. These include the following structures:

- Uranium Byproduct Cylinder (UBC) Storage Pad.
- Centrifuge Assembly Building.
- Cascade Halls.
- Cylinder Receipt and Dispatch Building.
- Blending and Liquid Sampling Area.
- Technical Services Building.
- Administration Building.
- Visitor Center.
- Security Building.
- Central Utilities Building.



1. Uranium Byproduct Cylinders (UBC) Storage Pad
2. Liquid Nitrogen (N_2) Tank No. 4
3. Centrifuge Assembly Building
4. Cascade Halls 1 & 2
5. Cascade Halls 3 & 4
6. Cascade Halls 5 & 6
7. Cylinder Receipt & Dispatch Building
8. Blending and Liquid Sampling Area
9. Technical Services Building (TSB)
10. Uranium Hexafluoride (UF_6) Handling Area
11. Liquid N_2 Tank No. 3
12. Liquid N_2 Tank No. 2
13. UBC Storage Pad Stormwater Retention Basin
14. Site Stormwater Detention Basin
15. Treated Effluent Evaporative Basin
16. Liquid N_2 Tank No. 1
17. Cooling Tower
18. Electrical Switch Gear
19. Administration Building
20. Visitor Center
21. Employee Parking
22. Security Building
23. Guard House
24. Central Utilities Building (CUB)
25. Meteorological Tower

200 0 200 Meters

600 0 600 Feet

Figure 2-4 Proposed NEF Site Layout (LES, 2004a)

Uranium Byproduct Cylinders (UBC) Storage Pad

The UBC Storage Pad (Item 1 in Figure 2-4) would be constructed on the north side of the controlled area to store transportation cylinders and UBCs. The UBCs are Type 48Y cylinders. The large concrete pad would initially be sized to store the first 5 years' worth of cylinders (about 1,600 cylinders) stacked 2 high in concrete saddles that would elevate them approximately 20 centimeters (8 inches) above ground level. The pad would be expanded as additional storage is required. The maximum size of the UBC storage pad would be 9 hectares (23 acres), and it would be able to store 15,727 cylinders (LES, 2004a).

Centrifuge Assembly Building

The Centrifuge Assembly Building (Item 3 in Figure 2-4) would be used for the assembly, inspection, and mechanical testing of the centrifuges prior to installation in the Cascade Halls. This building would also contain the Centrifuge Test and Postmortem Facilities that would be used to test the functional performance and operational problems of production centrifuges and ensure compliance with design parameters.

Cascade Halls

The six proposed Cascade Halls would be contained in three Separations Buildings (Items 4, 5, and 6 in Figure 2-4) near the center of the proposed NEF. Figure 2-5 is a photograph of centrifuges inside a cascade hall at Urenco. Each of the six proposed Cascade Halls would house eight cascades, and each cascade would consist of hundreds of centrifuges connected in series and parallel to produce enriched UF_6. Each Cascade Hall would be capable of producing a maximum of 545,000 SWU per year.

The centrifuges would be mounted on precast concrete-floor-mounted stands (flomels). Each Cascade Hall would be enclosed by a structural steel frame supporting insulated sandwich panels (metal skins with a core of insulation) to maintain a constant temperature within the cascade enclosure.

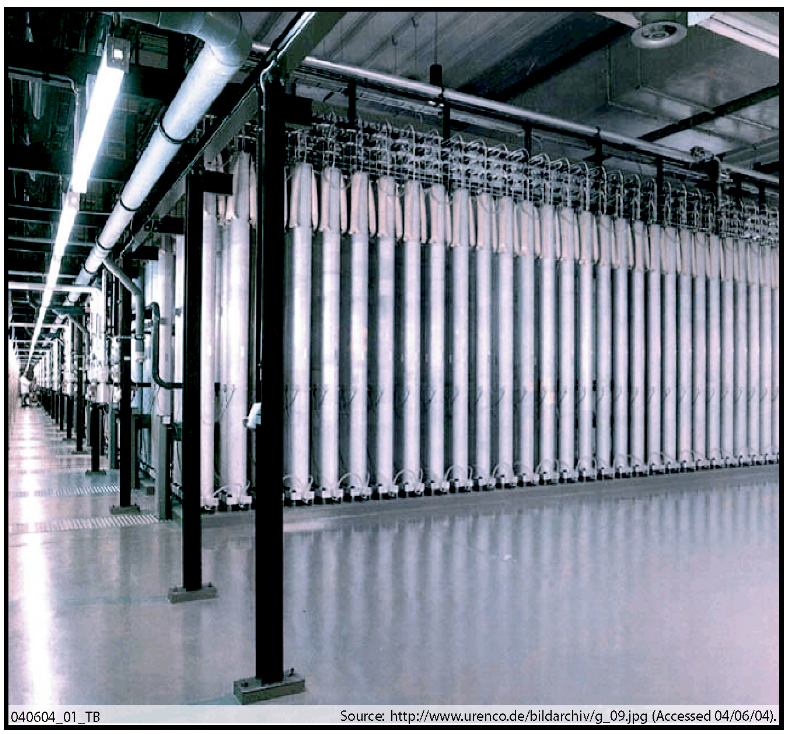


Figure 2-5 Inside a Cascade Hall (Urenco, 2003)

In addition to the Cascade Halls, each Separations Building module would house a UF_6 Handling Area and a Process Services Area. The UF_6 Handling Area would contain the UF_6 feed input system as well as the enriched UF_6 product, and DUF_6 takeoff systems. The Process Services Area would contain the gas transport piping and equipment, which would connect the cascades with each other and with the product and depleted materials takeoff systems. The Process Services Area would also contain key electrical and cooling water systems.

Cylinder Receipt and Dispatch Building

All UF_6 cylinders (feed, product, and UBCs) would enter and leave the proposed NEF through the Cylinder Receipt and Dispatch Building (Item 7 in Figure 2-4).

Blending and Liquid Sampling Area

The primary function of the Blending and Liquid Sampling Area (Item 8 in Figure 2-4) would be filling and sampling the Type 30B product cylinders with UF_6 enriched to the customer specifications and verifying the purity of the enriched product.

Technical Services Building

The Technical Services Building (Item 9 in Figure 2-4) would contain support areas for the facility and acts as the secure point of entry to the Separations Building Modules and the Cylinder Receipt and Dispatch Building. This building would contain the following functional areas:

- The *Control Room* would be the main monitoring point for the entire plant and provide all of the facilities for the control of the plant.
- The *Security Alarm Center* would be the primary security monitoring station for the facility. All electronic security systems would be controlled and monitored from this center.
- The *Cylinder Preparation Room* would provide a set-aside area for testing and inspecting new or cleaned Type 30B, 48X, and 48Y cylinders for use in the proposed NEF. It would be maintained under negative pressure and would require entry and exit through an airlock.
- The *Radiation Monitoring Control Room* would separate the non-contaminated areas from the potentially contaminated areas of the proposed plant. It would include personnel radiation monitoring equipment, hand-washing facilities and safety showers.
- The *Decontamination Workshop* would provide a facility for the removal of radioactive contamination from contaminated materials and equipment.
- The *Solid Waste Collection Room* would be used for processing wet and dry low-level solid waste.
- The *Liquid Effluent Collection and Treatment Room* would be used to collect, monitor, and treat potentially contaminated liquid effluents produced onsite.
- The *Gaseous Effluent Vent System Room* would be used to remove uranium and other radioactive particles and hydrogen fluoride from the potentially contaminated process gas streams.
- The *Laboratory Area* would provide space for laboratories where the purity and enrichment percentage of the enriched UF_6 would be measured and the impact of the proposed NEF on the environment would be monitored.

Administration Building

The Administration Building (Item 19 in Figure 2-4) would contain office areas and a security station. All personnel access to the proposed NEF would occur through the Administration Building.

Visitor Center

The Visitor Center (Item 20 in Figure 2-4) would be located outside the security fence close to New Mexico State Highway 234.

Security Building

The main Security Building (Item 22 in Figure 2-4) would be located on the main access road at the entrance to the proposed NEF. All traffic entering or leaving the proposed NEF would proceed past the Security Building.

Central Utilities Building

The Central Utilities Building (Item 24 in Figure 2-4) would house two diesel generators, which would provide standby and emergency power for the proposed facility as well as the electrical switchgear and heating, ventilation, and air-conditioning systems for the proposed facility.

2.1.4 Site Preparation and Construction

Site preparation for the construction of the proposed NEF would require the clearing of approximately 81 hectares (200 acres) of undisturbed pasture land within the 220-hectares (543-acre) site. The permanent plant structures, support buildings, and the UBC Storage Pad would occupy about 73 hectares (180 acres) of the 81 hectares (200 acres) if the UBC Storage Pad is expanded to its fullest capacity. Contractor parking and a lay-down area would occupy the remaining 8 hectares (20 acres). The contractor parking and lay-down area and areas around the building exteriors would be graded and restored after completion of the proposed construction (LES, 2004a).

Most of the disturbed area would be graded and would form the owner-controlled area. The disturbed area would comprise about one-third of the total site area. The undisturbed onsite areas (147 hectares [343 acres]) would be left in a natural state with no designated use for the life of the proposed NEF. Figure 2-6 shows the areas that would be cleared for construction activities.

Site Preparation

Groundbreaking at the proposed NEF site would begin in 2006, with construction continuing for eight years until 2013. The proposed site terrain currently ranges in elevation from +1,033 to +1,045 meters (+3,390 to +3,430 feet) above mean sea level. Because the proposed NEF requires an area of flat terrain, about 36 hectares (90 acres) would be graded to bring the site to a proposed final grade of +1,041 meters (+3,415 feet) above mean sea level. All material excavated onsite would be used for onsite fill, and no new material would be brought onto the proposed NEF site.

Site preparation would include the cutting and filling of approximately 611,000 cubic meters (797,000 cubic yards) of soil and caliche with the deepest cut being 4 meters (13 feet) and the deepest fill being 3.3 meters (11 feet) (LES, 2004a). In this phase, conventional earthmoving and grading equipment would be used. The removal of very dense soil or caliche could require the use of heavy equipment with ripping tools. Control of soil-removal work for foundations would follow to reduce over excavation and minimize construction costs. In addition, loose soil and/or damaged caliche would be removed prior to installation of foundations for seismically designed structures.

Subsurface geologic materials at the proposed NEF site generally consist of red clay beds, a part of the Chinle Formation of the Triassic-aged Dockum Group. Bedrock is covered with up to 17 meters (55 feet) of silty sand, sand, sand and gravel, and an alluvium that is part of the Antlers and/or Gatuña Formations. Foundation conditions at the site are generally good, and no potential for mineral development has been found at the site.

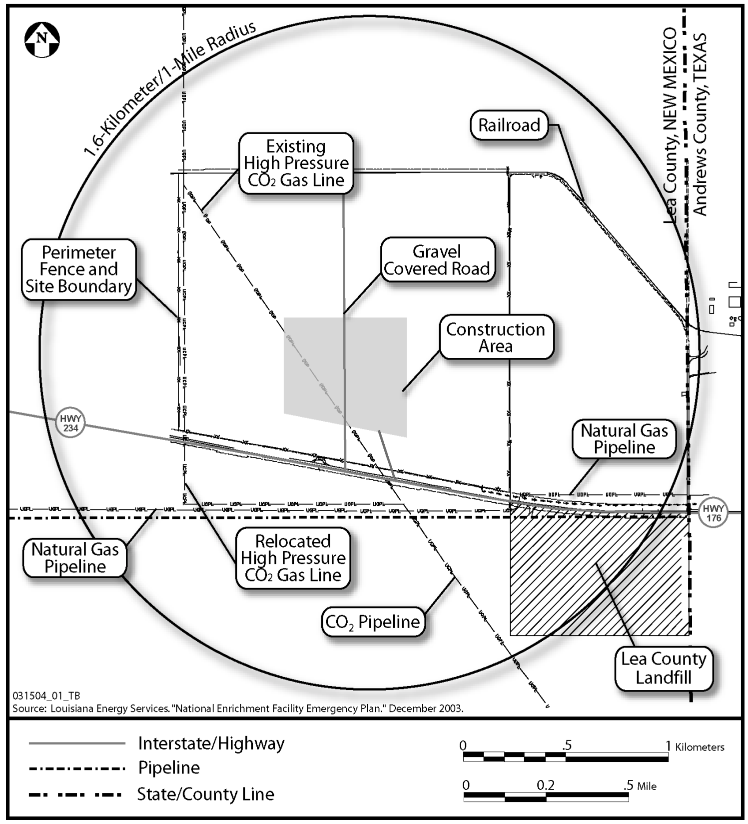


Figure 2-6 Construction Area for the Proposed NEF Site (LES, 2004a)

A 13.8 newtons per square millimeter (2,000 pounds-force per square inch) high-pressure CO_2 pipeline crosses the site diagonally from the southeast to the northwest. It would be relocated during the site preparation for safety considerations. The relocation would be performed in accordance with applicable regulations to minimize any direct or indirect impacts on the environment.

Soil Stabilization

An engineered system would control surface stormwater runoff for the proposed NEF. Construction and erosion control management practices would mitigate erosional impacts due to site clearing and grading. Part of construction work would involve stabilizing disturbed soils. Earth berms, dikes, and sediment fences would be used as necessary during all phases of construction to limit runoff. Much of the excavated areas would be covered by structures or paved, limiting the creation of new dust sources. Additionally, two stormwater detention basins would be constructed prior to land clearing to be used as sedimentation collection basins during construction, and they would be converted to stormwater detention or retention basins once the site is re-vegetated and stabilized.

One of the construction stormwater detention basins would be converted to the Site Stormwater Detention Basin (Item 14 in Figure 2-4) at the south side of the proposed site. The Site Stormwater Detention Basin would collect runoff from various developed parts of the site including roads, parking areas, and building roofs. It would be unlined and would have an outlet structure to control discharges above the design level. The normal discharge would be through evaporation to the air or infiltration into the ground. The basin's design would enable it to contain runoff for a rainfall of 15.2 centimeter (6.0

inch) in 24 hours, which is equal to the 100-year return frequency storm. In addition, the basin would have 60 centimeters (2 feet) of freeboard beyond design capacity.

The site is currently unimproved ground. Rainfall percolates into the soil or runs off into the roadside drainage ditch. After construction is completed part of the site would be covered with buildings and paved areas that would prevent rainfall from percolating into the soil. Runoff from the buildings and paved areas would be diverted to the Site Stormwater Detention Basin. The Basin would be equipped with an outfall that would be designed to limit the discharge flow rate to the same or less than the site's current runoff rate.

The Site Stormwater Detention Basin would have approximately 123,350 cubic meters (100 acre-feet) of storage capacity. The drainage area served would include about 39 hectares (96 acres), the majority of which would be the developed portion of the proposed NEF site. The water quality of the discharge would be typical of runoff from building roofs and paved areas from any industrial facility. Except for small amounts of oil and grease typically found in runoff from paved roadways and parking areas, the discharge would not be expected to contain contaminants.

The second stormwater detention basin built during construction would be converted to the UBC Storage Pad Stormwater Retention Basin (Item 13 in Figure 2-4) for the operation phase. The UBC Storage Pad Stormwater Retention Basin would collect and contain water discharges from two sources: (1) stormwater runoff from the UBC Storage Pad and (2) cooling tower blowdown discharges. This basin would be designed with a membrane lining to minimize ground infiltration of the water. Evaporation would be the primary method to eliminate the water from the UBC Stormwater Retention Basin. The basin would be designed to contain a volume equal to 30.4 centimeters (12 inches) of rainfall, which is double the 24-hour, 100-year return frequency storm plus an allowance for cooling tower blowdown water. The UBC Storage Pad Stormwater Retention Basin would be designed to contain a volume of approximately 77,700 cubic meters (63 acre-feet), which serves 9 hectares (23 acres), the maximum area of the proposed UBC Storage Pad.

Additional mitigation measures would be taken to minimize soil erosion and impacts during the construction phase. Mitigation measures proposed by LES during construction include:

- Watering the onsite construction roads periodically to control fugitive dust emissions, taking into account water conservation.

- Using adequate containment methods during excavation and other similar operations.

- Covering open-bodied trucks transporting materials likely to disperse when in motion.

- Promptly removing earthen materials dispensed on paved roads.

- Stabilizing or covering bare areas once earth-moving activities are completed.

After construction was complete, natural, low-water maintenance landscaping and pavement would be used to stabilize the site.

Spill Prevention

All construction activities would comply with the National Pollutant Discharge Elimination System (NPDES) general construction permit obtained from EPA Region 6. A Spill Prevention, Control, and Countermeasure plan would also be implemented during construction to minimize environmental impacts from potential spills and to ensure prompt and appropriate remediation. Potential spills during construction would likely occur around vehicle maintenance and fueling locations, storage tanks, and painting operations. The Spill Prevention, Control, and Countermeasure plan would identify sources, locations, and quantities of potential spills and response measures. The plan would also identify individuals and their responsibilities for implementation of the plan and provide for prompt notifications of State and local authorities, as required. Implementing best management practices for waste management would minimize solid waste and hazardous material generation during construction. These practices would include the placement of waste receptacles and trash dumpsters at convenient locations and the designation of vehicle and equipment maintenance areas for the collection of oil, grease, and hydraulic fluids. If external washing of construction vehicles would be necessary, no detergents would be used, and the runoff would be diverted to an onsite basin. Adequately maintained sanitary facilities would be available for construction crews.

Air Emissions

Construction activity would generate some degree of dust during the various stages of construction activity. The amount of dust emissions would vary according to the types of activity. The first five months of construction would likely be the period of highest emissions because approximately one-third of the 220-hectare (543-acre) proposed NEF site would be involved along with the greatest number of construction vehicles operating on an unprepared surface. However, it would be expected that no more than 18 hectares (45 acres) would be involved in this type of work at any one time.

Table 2-2 lists the estimated peak emission rates during construction of the proposed NEF. Emission rates for fugitive dust were estimated for a 10-hour workday assuming peak construction activity levels were maintained throughout the year. The calculated total work-day average emissions result for fugitive emission particulate would be 8.6 kilograms per hour (19.1 pounds per hour). Fugitive dust would most likely be caused by vehicular traffic on unpaved surfaces, earth moving, excavating and bulldozing, and to a lesser extent wind erosion.

Table 2-2 Estimated Peak Emission Rates During Construction (Based on 10 hours per day, 5 days per week, and 50 weeks per year)

Pollutant	Average Emissions, kilograms per hour (pounds per hour)
Vehicle Emissions	
Hydrocarbons	2.1 (4.6)
Carbon Monoxide	13.3 (29.4)
Nitrogen Oxides	7.53 (59.8)
Sulfur Oxides	2.7 (6.0)
Particulate	1.9 (4.3)
Fugitive Emissions	
Particulate	8.6 (19.1)

Source: LES, 2004b.

Sanitary Waste

In lieu of connecting to the local sewer system, six onsite underground septic systems would be installed for the treatment of sanitary wastes. Each septic system would consist of a septic tank with one or more leachfields. Together, the 6 septic systems would be sized to process 40,125 liters per day (10,600 gallons per day), which is sufficient flow capacity for approximately 420 people. Assuming an average water use of 95 liters per day (25 gallons per day) per person, the planned staff of 210 full-time employees would use approximately 20,000 liters per day (5,283 gallons per day) which, if evenly distributed, means the planned septic systems would operate at about 50 percent of design capacity (LES, 2004a).

Construction Work Force

Table 2-3 presents the estimated average annual number of construction employees who would work on the proposed NEF site during construction and their annual pay. The construction force is anticipated to peak at about 800 workers from 2008 to 2009. During early construction stages of the project, the work force would be expected to consist primarily of structural crafts workers, most of whom would be recruited from the local area. As construction progresses, there would be a transition to predominantly mechanical and electrical crafts. The bulk of this labor force would come from the surrounding 120-kilometer (75-mile) region, which is known as the region of influence.

Table 2-3 Estimated Number of Construction Workers by Annual Pay

	Number of Workers by Salary Range				Total Number of Workers
Year	**$0 - 16,000**	**$17,000 - 33,000**	**$34,000 - 49,000**	**$50,000 - 82,000**	**Average Number per Year**
2006	100	100	50	5	255
2007	50	75	350	45	520
2008	50	100	500	50	700
2009	50	100	600	50	800
2010	50	25	300	50	425
2011	10	25	100	60	195
2012	10	15	75	40	140
2013	10	15	75	40	140

Source: LES, 2004b.

Construction Materials

Construction of the proposed NEF would require many different commodities. Table 2-4 lists materials that would be used during the construction phase, and most of these materials would be obtained locally.

Table 2-4 Selected Commodities and Resources to be Used During Construction of Proposed NEF

Description	Quantity
Water	7,570 cubic meters (2 million gallons) [a] annually
Asphalt Paving	72,940 cubic meters (95,400 cubic yards)
Chain link Fencing	15.1 kilometers (9.3 miles)
Concrete	59,196 cubic meters (77,425 cubic yards)
Concrete Paving	1,614 cubic meters (2,111 cubic yards)
Copper & Aluminum Wiring	362 kilometers (225 miles)
Crushed Stone	287,544 square meters (343,900 square yards)
Electrical Conduit	121 kilometers (75 miles)
Piping (Carbon & Stainless Steel)	56 kilometers (34.6 miles)
Roofing Materials	52,074 square meters (560,500 square feet)
Stainless & Carbon Steel Ductwork	515 metric tons (568 tons)

[a] Escalated from the formerly proposed Claiborne Enrichment Facility. The value from the Claiborne Enrichment Facility was doubled since the proposed NEF would have double the production capacity, and the total was then increased by 65 percent to account for the semi-arid climate of the proposed site (NRC, 1994).
Source: LES, 2004a.

2.1.5 Local Road Network

New Mexico Highway 234 is a 2-lane highway located on the southern border of the proposed NEF site with 3.6-meter (12-foot) wide driving lanes, 2.4-meter (8-foot) wide shoulders, and a 61-meter (200-foot) right-of-way easement on either side. The highway provides direct access to the site. A gravel-covered road currently runs north from the highway through the center of the site to the sand and gravel quarry to the north. Two access roads would be built from the highway to support construction. The materials delivery construction access road would run north from the highway along the west side of the proposed NEF. The personnel construction access road would run north from the highway along the east side of the proposed NEF. Both roadways would eventually be paved and converted to permanent access roads upon completion of construction.

Over-the-road trucks of various sizes and weights would deliver construction material to the proposed NEF. Delivery vehicles would range from heavy-duty 18-wheeled tractor trailers to commercial box and light-duty pick-up trucks. Delivery vehicles from the north and south would travel New Mexico Highway 18 or New Mexico Highway 207 to New Mexico Highway 234. The intersection of New Mexico Highway 18 and New Mexico Highway 234 is approximately 6.4 kilometers (4 miles) west of the site. While the intersection of New Mexico Highway 207 and New Mexico Highway 234 is further west, construction material would also travel from the east by way of Texas Highway 176, which becomes New Mexico Highway 234 at the New Mexico/Texas State line. Construction material from the west would come by way of New Mexico Highway 8, which becomes New Mexico Highway 234 near the city of Eunice west of the site. Due to the presence of a quarry directly north of the site, bulk aggregate trucks might also use the onsite gravel road that currently leads to the quarry.

Planned maintenance to New Mexico Highway 234 include the resurfacing, restoration, and rehabilitation of existing lanes to improve roadway quality, enhance safety, and further economic development. However, no time frame has been established for the maintenance activities (NMDOT, 2004b).

2.1.6 Proposed Facility Utilities and Other Services

The proposed NEF would require the installation of water, natural gas, and electrical utility lines.

Water Supply

The proposed NEF water supply would be obtained from the municipalities of Eunice and Hobbs, New Mexico. This would be performed by running new potable water pipelines from the municipal water supply systems for Eunice and Hobbs to the proposed NEF site. The pipeline from Eunice would be about 8 kilometers (5 miles) long, and the pipeline from Hobbs would be about 32 kilometers (20 miles) long. Both pipelines would run inside the Lea County right-of-way easements along New Mexico Highways 18 and 234.

Current capacities for the Eunice and Hobbs municipal water supply systems are 16,350 cubic meters per day (4.32 million gallons per day) and 75,700 cubic meters per day (20 million gallons per day), respectively. Current Eunice and Hobbs usages are about 5,600 cubic meters per day (1.48 million gallons per day) and 23,450 cubic meters per day (6.2 million gallons per day), respectively. The average and peak potable water requirements for operation of the proposed NEF would be approximately 240 cubic meters per day (63,423 gallons per day) and 2,040 cubic meters per day (539,000 gallons per day), respectively (Abousleman, 2004; Woomer, 2004).

Natural Gas

A 406-millimeter (16-inch) diameter underground natural gas pipeline owned by the Sid Richardson Energy Services Company is located along the south property line paralleling New Mexico Highway 234. This pipeline would supply natural gas for the proposed NEF.

Electrical Power

The proposed NEF would require approximately 30 megawatts of electricity. This power would be supplied by two new synchronized 115-kilovolt overhead transmission lines on a large loop system. These lines would tie into a trunk line about 13 kilometers (8 miles) west of the proposed site. Currently, there are several power poles along the highway in front of the adjacent vacant parcel east of the proposed site, and a 61-meter (200-foot) right-of-way easement along both sides of New Mexico Highway 234 would allow installation of utility lines within the highway easement. In conjunction with the new electrical lines serving the site, Xcel Energy, the local electrical service company, would install two independent substations to ensure redundant service. Associated power-support structures would be installed along New Mexico Highway 234. An application for highway easement modification would be submitted to the State. The average power requirement and the peak power requirement of the facility are approximately 30.3 million volt-amps and 32 million volt-amps, respectively (LES, 2004b).

2.1.7 Proposed Facility Operation

At full production, the proposed NEF would receive 8,600 metric tons (9,480 tons) per year of UF_6 containing a concentration of 0.72 percent by weight of the ^{235}U isotope. The proposed NEF would enrich natural UF_6 feed material to between 3 and 5 percent by weight of the ^{235}U isotope. DUF_6 gas would be transferred to a Type 48Y cylinder where the gas would cool to a solid. LES would store the cylinder on the UBC Storage Pad until final dispositioning.

Receiving UF_6 Feed Material

Figure 2-7 Cylinder of UF_6 Being Unloaded (Urenco, 2004b)

Figure 2-7 shows the unloading of a Type 48Y cylinder. The proposed 8,600 metric tons (9,480 tons) of natural UF_6 feed material would be processed by the cascades to generate up to 800 metric tons (882 tons) of enriched UF_6 product and 7,800 metric tons (8,600 tons) of DUF_6 material each year. The feed material would be shipped to the proposed NEF in standard Type 48X or 48Y cylinders. Both of these cylinders are U.S. Department of Transportation (DOT) approved containers for transporting Type A radioactive material (DOE, 1999a) from the UF_6 generation facilities in Port Hope, Ontario, Canada or Metropolis, Illinois. A fully loaded Type 48Y cylinder weighs 14.9 metric tons (16.4 tons) and is shipped one per truck (WNTI, 2004). Therefore, the site would receive an average of three shipments of natural UF_6 feed material every day (assuming only weekday shipments). After receipt and inspection, the cylinder could be stored until needed or connected to the gas centrifuge cascade at one of several feed stations. Once installed in the feed station, the transport cylinders would be heated to sublime the solid UF_6 into a gas that would be fed to the gas centrifuge enrichment cascade.

After the cylinder has been emptied, it would be inspected and processed for reuse. The proposed NEF currently has no plans for internal cleaning or decontamination of the cylinders. The Type 48X cylinders are smaller than the Type 48Y cylinders and would not be used for onsite storage of the DUF_6 material. They would be returned to the supplier for reuse or disposed of at a licensed facility. The Type 48Y cylinders would be used to store DUF_6 material on the UBC Storage Pad or returned to the supplier. A Type 48Y cylinder filled with DUF_6 would be designated as a UBC.

Producing Enriched UF_6 Product

The proposed NEF would be constructed in stages to allow enrichment operations to begin while additional cascade halls are still under construction. The first set of enrichment cascades would begin operating as soon as practical. This ramped production schedule would allow the proposed facility to begin operation only two years after initial groundbreaking. Production of enriched UF_6 product would increase from approximately 77 metric tons (85 tons) in 2008 to a maximum of 800 metric tons (882 tons) by 2013 (LES, 2004a).

Shipping Enriched Product

Enriched UF_6 product would be shipped in a Type 30B cylinder, which is 76 centimeters (30 inches) in diameter and 206 centimeters (81 inches) long and holds a maximum of 2.3 metric tons (2.5 tons) of 5-percent enriched $^{235}UF_6$. Figure 2-8 shows Type 30B enriched product cylinders and overpacks being loaded for transport. At full production, the proposed NEF would produce 800 metric tons (882 tons) of enriched product which, at 2.3 metric tons (2.5 tons) per cylinder and 3 cylinders per truck, would require approximately 2 trucks per week to be shipped to the fuel fabricators in Richland, Washington; Wilmington, North Carolina; or Columbia, South Carolina.

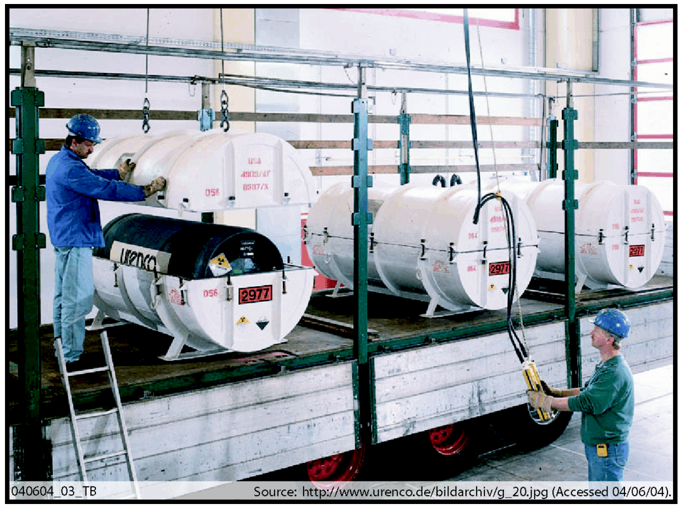


Figure 2-8 Shipment of Enriched Product (Urenco, 2004b)

Storing DUF_6 Material

During operation of the proposed NEF, the production of DUF_6 material would increase from 748 metric tons (825 tons) to 7,800 metric tons (8,600 tons) per year. This material would fill between 66 and 627 cylinders per year. Table 2-5 shows the potential maximum and anticipated quantity of Type 48Y cylinders that would be filled with DUF_6 material each year during the anticipated life of the proposed NEF.

The “Maximum” production column shown in Table 2-5 provides a upper limit bounding guide for the operation of the proposed NEF. It does not consider a sequential shutdown or progressive decommissioning of the proposed NEF. The proposed NEF would undergo sequential decommissioning which would reduce the production capability of the proposed facility as the cascades are shut down in sequence and the proposed NEF undergoes sequential decommissioning. The “Anticipated” production column incorporates this sequential shutdown into the estimated production of DUF_6 material during the operational life of the proposed NEF.

The DUF_6 material would be stored in Type 48Y cylinders on the UBC Storage Pad until a final disposition option is identified. The UBC Storage Pad would be able to hold up to 15,727 cylinders, which is the maximum projected production of the DUF_6 material cylinders.

Figure 2-9 shows the material flow of feed, enriched, and DUF_6 material and cylinders during full operation of the proposed NEF.

Table 2-5 Maximum and Anticipated Yearly Production of Cylinders of DUF_6 over 30-Year License

Year	Maximum		Anticipated	
	Yearly UBCs Filled	Cumulative UBCs Filled	Yearly UBCs Filled	Cumulative UBCs Filled
2008	66	66	66	66
2009	196	262	196	262
2010	313	575	313	575
2011	431	1,006	431	1,006
2012	548	1,554	548	1,554
2013	623	2,177	623	2,177
2014 to 2027	627	2,804 to 10,955	627	2,804 to 10,955
2028	627	11,582	561	11,516
2029	627	12,209	444	11,960
2030	627	12,836	326	12,286
2031	627	13,463	209	12,495
2032	627	14,090	92	12,587
2033	561	14,651	5	12,592
2034	444	15,095	0	12,592
2035	326	15,421	0	12,592
2036	209	15,630	0	12,592
2037	92	15,722	0	12,592
2038	5	15,727	0	12,592
2039	0	15,727	0	12,592

Source: LES, 2004c.

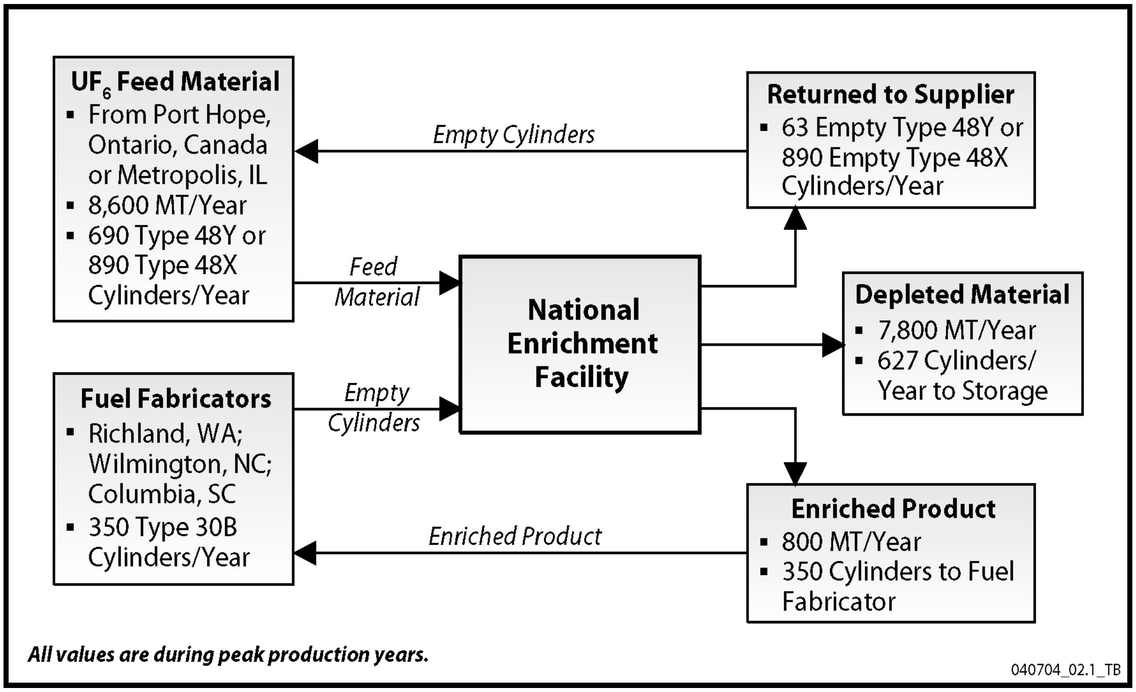


Figure 2-9 Flow from Feed, Enriched, and DUF_6 Material

Operations Work Force

An estimated 210 full-time workers would be required during full operation of the proposed NEF, providing an average of 150 jobs per year over the life of the facility. The average total annual wages and benefits paid to these workers would be $10.5 million per year. The annual number of production workers would increase as construction activities tapered off and, correspondingly, the production work force would reduce as decommissioning activities began.

Production Process Systems

The primary product of the proposed NEF would be enriched UF_6 product. Production of enriched UF_6 would require the safe operation of multiple plant support systems to ensure the safe operation of the facility. The principal process systems required for the safe and efficient production of enriched UF_6 product would include the following:

- Decontamination System.
- Fomblin® Oil Recovery System.
- Liquid Effluent Collection and Treatment System.
- Stormwater Retention and Detention Basins
- Solid Waste Collection System.
- Gaseous Effluent Vent Systems.
- Centrifuge Test and Postmortem Exhaust Filtration System.

Containers Used for Transportation and Storage of UF_6

Type 48X or Type 48Y cylinders would be used to transport feed material (natural UF_6) to the proposed NEF site. Only 48Y cylinders would be used for temporary storage of DUF_6 on the UBC Storage Pad. The difference between the Type 48X and 48Y cylinders is their capacity. Both containers are constructed of American Society for Testing and Materials (ASTM) type A-516 steel, and both can be used to transport UF_6 enriched up to 4.5 percent ^{235}U.

Type 30B containers would be used to transport enriched UF_6 to fuel fabrication facilities. Type 30B containers have additional design requirements as specified in 10 CFR § 71.51 to permit the safe transportation of higher enriched UF_6 than the Type 48X or 48Y containers.

	Type 48X	**Type 48Y**	**Type 30B**
Diameter	1.2 meters (48 inches)	1.2 meters (48 inches)	0.76 meter (30 inches)
Length	3.0 meters (119 inches)	3.8 meters (150 inches)	2.06 meters (81 inches)
Wall Thickness	16 millimeters (0.625 inch)	16 millimeters (0.625 inch)	12.7 millimeters (0.5 inch)
Empty Weight	2,041 kilograms (4,500 pounds)	2,359 kilograms (5,200 pounds)	635 kilograms (1,400 pounds)
UF_6 Capacity	9,540 kilograms (21,000 pounds)	12,500 kilograms (27,560 pounds)	2,277 kilograms (5,020 pounds)

Source: DOE, 1999a; LES, 2004a; USEC, 1995.

Decontamination System

The Decontamination System would be designed to remove radioactive contamination from centrifuges, pipes, instruments, and other potentially contaminated equipment. The system would contain equipment and processes to disassemble, clean and degrease, decontaminate, and inspect plant equipment. Scrap and waste material from the decontamination process would be sent to the solid or liquid waste processing system for segregation and treatment prior to offsite disposal at a licensed facility. Exhaust air from the decontamination system area would pass through the gaseous effluent vent system before discharge to the atmosphere.

Fomblin® Oil Recovery System

Vacuum pumps would maintain the vacuum between the rotor and casing of the centrifuge. The pumps would use a perfluorinated polyether oil, such as Fomblin® oil, which is a highly fluorinated, nonflammable, chemically inert, thermally stable oil for vacuum pump lubrication and seal maintenance. The Fomblin® oil would provide long service life and would not react with UF_6 gas. Disposal and replacement of the oil is very expensive, which makes recovery and reuse the preferred practice. The Fomblin® Oil Recovery System would reclaim spent oil from the UF_6 processing system, and filter and recondition it for reuse by the proposed NEF. The recovery would employ anhydrous sodium carbonate (soda ash) in a laboratory-scale precipitation process to remove the primary impurities and activated carbon to remove trace amounts of hydrocarbons.

Liquid Effluent Collection and Treatment System

The Liquid Effluent Collection and Treatment System would collect potentially contaminated liquid effluents generated in a variety of plant operations and processes. These liquid effluents would be collected in holding tanks and then transferred to bulk storage tanks prior to disposal. Significant and slightly contaminated liquids would be processed for uranium recovery while noncontaminated liquids would be rerouted to the Treated Effluent Evaporative Basin. Figure 2-10 shows the annual effluent input streams, which include hydrolyzed UF_6, degreaser water, citric acid, laundry water, floor-wash water, hand-wash/shower water, and miscellaneous effluent.

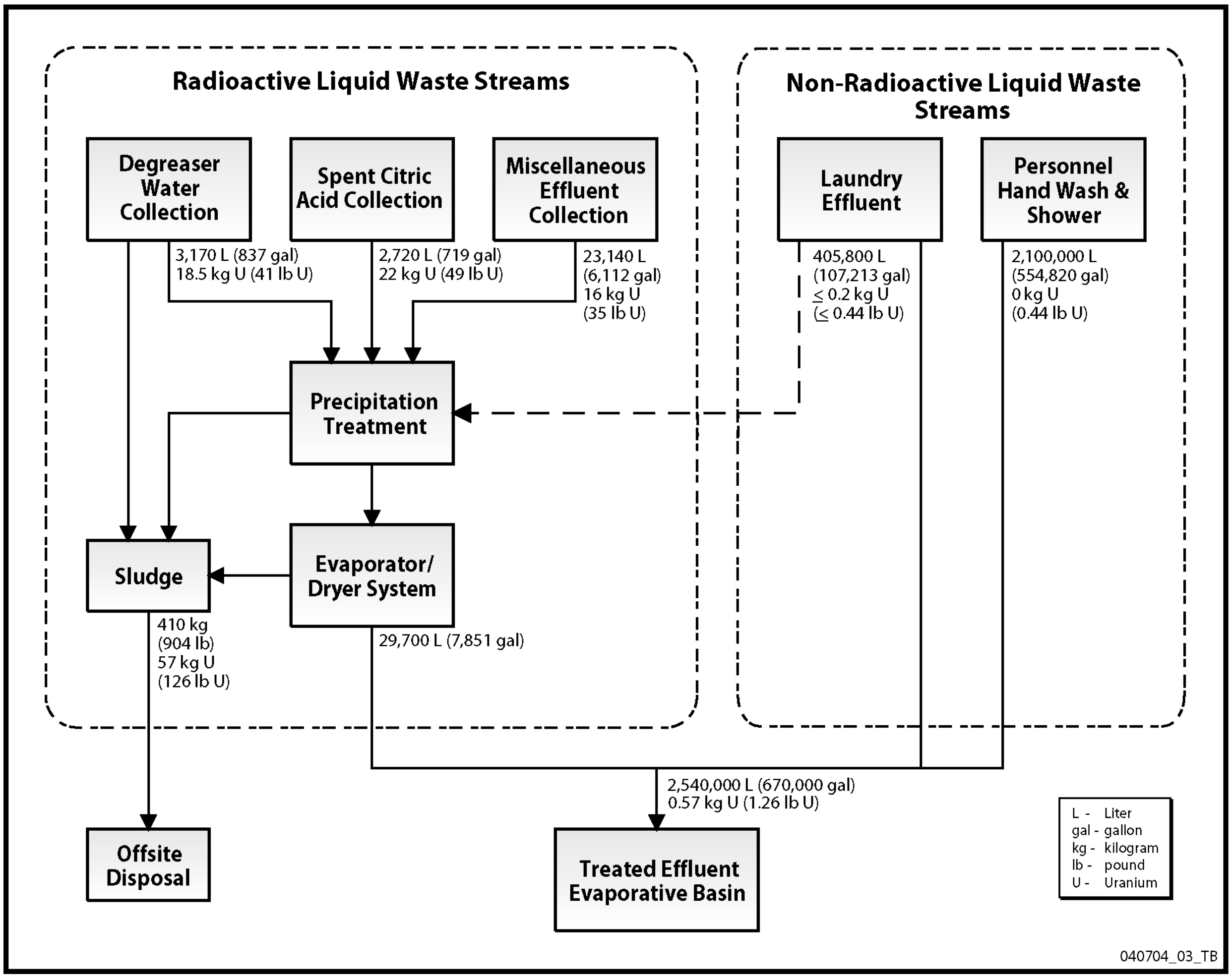


Figure 2-10 Liquid Effluent Collection and Treatment

The Treated Effluent Evaporative Basin (Item 15 on Figure 2-4) would receive liquid discharged from the Liquid Effluent Collection and Treatment System. This liquid could contain low concentrations of uranium compounds and uranium decay products. This uranium-bearing material would settle to the bottom of the Treated Effluent Evaporative Basin and collect in the sludge on the bottom of the basin during the operation of the proposed NEF. The sludge would be disposed of as low-level radioactive waste during the decommissioning of the facility.

The Treated Effluent Evaporative Basin would be a double-lined basin built in accordance with New Mexico Environment Department Guidelines for Liner Material and Site Preparation for Synthetically-Lined Lagoons. The basin foundation would be about 60-centimeter (2-foot) thick clay layer, compacted in place and covered with a high-strength geosynthetic liner. A leak-collection piping system and drainage mat would be installed on top of the liner. A sump system would collect any liquid from the collection piping and pump it back into the Treated Effluent Evaporative Basin. A second geosynthetic liner would cover the collection piping, mat, and sump system. The top liner would be covered with a 30-centimeter (1-foot) thick layer of compacted clay.

Animal-friendly fencing would surround the Treated Effluent Evaporative Basin to prevent access to animals and unauthorized personnel. The surface of the basin would be covered with surface netting or similar material to exclude waterfowl.

Stormwater Retention and Detention Basins

All normal stormwater and runoff waters would be routed from the buildings, parking lot, and roadways to a Site Stormwater Detention Basin (Item 14 on Figure 2-4) and allowed to infiltrate the soil or evaporate. Runoff and stormwaters from the UBC Storage Pad would be routed to a lined basin for evaporation. This would allow the water from the UBC Storage Pad to be monitored and minimize the potential for contaminants entering the soil. Six separate septic systems throughout the proposed NEF would collect and process all sanitary waste from the facility in accordance with applicable regulations.

Neither the Treated Effluent Evaporative Basin nor the two stormwater basins would meet the definition of "surface water" in the State of New Mexico Standards for Interstate and Intrastate Surface Waters. According to these standards, "Waste treatment systems, including treatment ponds or lagoons designed to meet requirements of the Clean Water Act (other than cooling ponds as defined in 40 CFR § 423.11(m) which also meet the criteria of this definition), are not surface waters of the State, unless they were originally created in surface waters of the State or resulted in the impoundment of surface waters of the State" (NMWQCC, 2002).

Solid Waste Collection System

In addition to the DUF_6, operation of the proposed NEF would generate other radioactive and nonradioactive solid wastes. Solid waste would be segregated and processed based on its classification as wet solid or dry solid wastes and segregated into radioactive, hazardous, or mixed-waste categories. Wet solid waste would include wet trash (waste paper, packing material, rags, wipes, etc.), oil-recovery sludge, oil filters, miscellaneous oils (such as cutting machine oils), solvent recovery sludge, and uranic waste precipitate. Dry solid waste would include trash (combustible and non-metallic items), activated carbon, activated alumina, activated sodium fluoride, high efficiency particulate air (HEPA) filters, scrap metal, laboratory waste, and dryer concentrate. All solid waste would be segregated, compacted, packaged, and sent to a licensed low-level waste disposal facility such as Hanford or Envirocare.

Material that would be classified as mixed waste or *Resource Conservation and Recovery Act* (RCRA) material would be segregated and disposed of in accordance with the State of New Mexico regulations (EPA, 2003).

Nonradioactive wastes—including office and warehouse trash such as wood, paper, and packing materials; scrap metal and cutting oil containers; and building ventilation filters—would be collected, compacted, and packaged and sent to a commercial landfill for disposal.

Figure 2-11 shows the disposal pathways and anticipated volumes for the miscellaneous solid waste that would be generated by the proposed NEF.

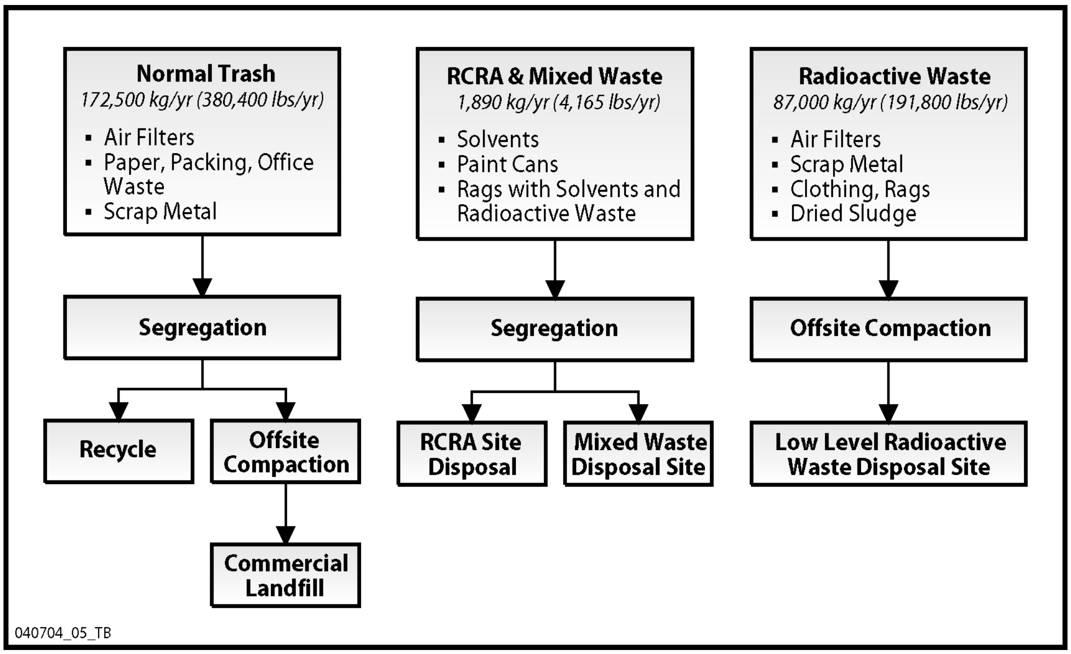


Figure 2-11 Disposal Pathways and Anticipated Volumes for Solid Waste

Gaseous Effluent Vent Systems

The Gaseous Effluent Vent Systems would be designed to collect the potentially contaminated gaseous streams in the Technical Services Building (Item 9 in Figure 2-4) and treat them before discharge to the atmosphere. The system would route these streams through a filter system prior to exhausting out a vent stack. The vent stack would contain a continuous monitor to measure radioactivity levels. Potentially contaminated gaseous streams in the Technical Services Building would include ventilation air from the Ventilation Room, Decontamination Workshop, Laundry, Fomblin® Oil Recovery System, Decontamination System, Chemical Laboratory, and Vacuum Pump Rebuild Workshop. The total airflow would be handled by a central gaseous effluent distribution system that would maintain the areas under negative pressure. The treatment system would include a single train of three air filters (a pre-filter, a HEPA filter, and an activated carbon filter impregnated with potassium carbonate), centrifugal fan, automatically operated inlet-outlet isolation dampers, monitoring system, and differential pressure transducers.

Urenco's experience in Europe shows uranium discharges from Gaseous Effluent Vent Systems are less than 10 grams (0.35 ounces) per year (LES, 2004a; LES, 2004b).

Nonradioactive gaseous effluents include argon, helium, nitrogen, hydrogen fluoride, and methylene chloride (LES, 2004a). Approximately 440 cubic meters (15,540 cubic feet) of helium, 190 cubic meters (6,709 cubic feet) of argon and 53 cubic meters (1,872 cubic feet) of nitrogen would be released each year. In addition, 610 liters (161 gallons) of methylene chloride and 40 liters (11 gallons) of ethanol would be vented each year. Two natural gas-fired boilers (one in operation and one spare) would be used to provide hot water for the plant heating system. At 100-percent power, each boiler would emit approximately 0.8 metric tons (0.88 tons) per year of volatile organic compounds; 0.5 metric tons (0.55 tons) per year of carbon monoxide; and 5.0 metric tons (5.5 tons) per year of nitrogen dioxide (LES, 2004a). The boilers would be permitted for operation as non-Title V sources under 40 CFR Part 61 "National Emission Standards for Hazardous Air Pollutants" (NESHAP) (LES, 2004a).

In addition, there would be two diesel generators onsite for use as emergency electrical power sources. Because the diesel generators would have the potential to emit more than 90,700 kilograms (100 tons) per year of a regulated air pollutant, they would only run a limited number of hours per year to avoid being classified as Title V sources.

Centrifuge Test and Postmortem Facilities Exhaust Filtration System

The Centrifuge Test and Postmortem Facilities Exhaust Filtration System would exhaust potentially hazardous contaminants from the Centrifuge Test and Postmortem Facilities. The system would also ensures the Centrifuge Postmortem Facility is maintained at a negative pressure with respect to adjacent areas.

The ductwork would be connected to a single-filter station and exhaust through either of two 100-percent fans. The filter station and either of the two fans would be able to handle 100 percent of the effluent exhaust. One of the fans would normally be on standby status. Activities that require the Centrifuge Test and Postmortem Facilities Exhaust Filtration System to be operational would be manually stopped if the system fails or shuts down. After filtration, the clean gases would be discharged through the monitored exhaust stack on the Centrifuge Assembly Building. The Centrifuge Assembly Building exhaust stack would be monitored for hydrogen fluoride and alpha radiation.

2.1.8 Proposed Facility Decontamination and Decommissioning

The proposed NEF would be licensed for 30 years. Before license termination, the proposed NEF would be decontaminated and decommissioned to levels suitable for unrestricted use. All proprietary equipment and radiologically contaminated components would be removed, decontaminated, and shipped to a licensed disposal facility. The buildings, structures, and selected support systems would be cleaned and released for unrestricted use. Before the start of the decontamination and decommissioning activities, a Decommissioning Plan would be prepared in accordance with the requirements of 10 CFR § 70.38 and submitted to the NRC for approval.

Decontamination and dismantling of the equipment would be conducted in the three Separations Building modules sequentially (in three phases) over a nine-year time frame. Decommissioning of the remaining plant systems and buildings would begin after operations in the final Separations Building module were terminated. The sequential construction of the three Cascade Halls would allow each hall to be isolated during the decommissioning activities. This isolation would help prevent re-contamination of an area once it has been fully decontaminated.

At the end of the useful life of each Separations Building module, the enrichment-process equipment would be shut down and UF_6 removed to the fullest extent possible by normal process operation. This would be followed by evacuation and purging with nitrogen. The shutdown and purging portion of the decommissioning process would take approximately three months for each cascade.

Prompt decontamination or removal of all materials from the site that would prevent release of the facility for unrestricted use would be performed. This approach would avoid long-term storage and monitoring of radiological and hazardous wastes onsite. All of the enrichment equipment would be removed, and only the building shells and site infrastructure would remain. All remaining facilities would be decontaminated to levels that would allow for unrestricted use. DUF_6, if not already sold or otherwise disposed of prior to decommissioning, would be disposed of in accordance with regulatory requirements. Other miscellaneous radioactive and hazardous wastes would be packaged and shipped to a licensed facility for disposal.

Following decommissioning, the entire site would be available for unrestricted use. Decommissioning would generally include the following activities:

- Installation of decontamination facilities.
- Purging of process systems.
- Dismantling and removal of equipment.
- Decontamination and destruction of confidential and secret, restricted-data material.
- Sales of salvaged materials.
- Disposal of wastes.
- Completion of a final radiation survey and spot decontamination.

Decommissioning would require residual radioactivity to be reduced below regulatory limits so the facilities could be released for unrestricted use. The intent of decommissioning would be to release the site for unrestricted use.

<u>Dismantling the Facility</u>

Dismantling would require cutting and disconnecting all components requiring removal. The activities would be simple but very labor-intensive and generally require the use of protective clothing. The work process would be optimized through consideration of the following measures:

- Minimizing the spread of contamination and the need for protective clothing.

- Balancing the number of cutting and removal operations with the resultant decontamination and disposal requirements.

- Optimizing the rate of dismantling with the rate of decontamination facility throughput.

- Providing storage and laydown space as required for effective workflow, criticality, safety, security, etc.

The decontamination and decommissioning effort would start in 2027 and end by 2036. Specific details of the planned decommissioning of the proposed NEF would be formally proposed in the Decommissioning Plan submitted to the NRC in 2025. Optimization of the decontamination and decommissioning process would occur near the end of the proposed facility's life to take advantage of advances in technology that are likely to occur in between now and the start of the decontamination and decommissioning activities. To avoid laydown space and contamination problems, dismantling would proceed generally no faster than the downstream decontamination process. The timeframe to accomplish both dismantling and decontamination is estimated to be approximately three years for each Separations Building module.

Items to be removed from the facilities would be categorized as potentially re-usable equipment, recoverable scrap, and wastes. However, operating equipment would not be assumed to have reuse value. Wastes would also have no salvage value.

A significant amount of scrap aluminum, steel, copper, and other metals would be recovered during the disassembly of the enrichment equipment. For security and convenience, the uncontaminated materials would likely be shred or smelt to standard ingots and, if possible, sold at market price. The contaminated materials would be disposed of as low-level radioactive waste.

Disposal

All wastes produced during decommissioning would be collected, handled, and disposed of in a manner similar to that described for those wastes produced during normal operation. Wastes would consist of normal industrial trash, nonhazardous chemicals and fluids, small amounts of hazardous materials, and radioactive wastes. Radioactive wastes would consist primarily of crushed centrifuge rotors, trash, and citric cake. Citric cake consists of uranium and metallic compounds precipitated from citric acid decontamination solutions. Approximately 5,000 cubic meters (6,600 cubic yards) of radioactive waste would be generated over the 9-year decommissioning period. This waste would be subject to further volume-reduction processes prior to disposal. Table 2-6 provides estimates for the amounts and types of radioactive wastes expected to be disposed.

Table 2-6 Radioactive Waste Disposal Volume from Dismantling Activities

Low-Level Radioactive Waste Type	**Disposal Volume cubic meters (cubic yards)**	**Maximum Number of Drums[a]**
Solidified Liquid Wastes	432 (565)	2,159
Centrifuge Components, Piping, and Other Parts	1,036 (1,355)	5,180
Aluminum	3,602 (4,711)	Not Supplied
Total	**5,070 (6,631)**	**7,339**

[a] 55-gallon (208-liter) drums.
Source: LES, 2004b.

Radioactive wastes would ultimately be disposed of in licensed low-level radioactive waste disposal facilities. Hazardous wastes would be disposed of in licensed hazardous waste disposal facilities. Nonhazardous and nonradioactive wastes would be disposed of in a manner consistent with good industrial practice and in accordance with applicable regulations. A complete estimate of the wastes and effluent to be produced during decommissioning would be provided in the Decommissioning Plan that LES would submit prior to the start of the decommissioning.

Final Radiation Survey

A final radiation survey would verify complete decontamination of the proposed NEF prior to allowing the site to be released for unrestricted use. The evaluation of the final radiation survey would be based in part on an initial radiation survey performed prior to initial operation. The initial survey would determine the natural background radiation levels in the area of the proposed NEF, thereby providing a benchmark for identifying any increase in radioactivity levels in the area. The final survey would measure radioactivity over the entire site and compare it to the original benchmark survey. The intensity of the survey would vary depending on the location (i.e., the buildings, the immediate area around the buildings, and the remainder of the site). A report would document the survey procedures and results, and would include, among other things, a map of the survey of the proposed site, measurement results, and a comparison of the proposed NEF site's radiation levels to the surrounding area. The results would be analyzed to show that they were below allowable residual radioactivity limits; otherwise, further decontamination would be performed.

Decontamination of Facilities

Decontamination would deal primarily with radiological contamination from ^{238}U, ^{235}U, uranium-234, and their daughter products. The primary contaminant throughout the plant would be in the form of small amounts of uranium oxide and uranium fluoride compounds.

At the end of the plant's life, some of the equipment, most of the buildings, and all of the outdoor areas should already be acceptable for release for unrestricted use. If accidentally contaminated during normal operation, they would be cleaned and decontaminated when the contamination was discovered. This would limit the scope of decontamination necessary at the time of decommissioning.

Contaminated plant components would be cut up or dismantled, and then processed through the decontamination facilities. Contamination of site structures would be limited to areas in the Separations Building modules and Technical Services Building, and would be maintained at low levels throughout plant operation by regular surveys and cleaning. The use of special sealing and protective coatings on porous and other surfaces that might become radioactively contaminated during operation would simplify the decontamination process and the use of standard good-housekeeping practices during operation of the proposed facility would ensure that final decontamination of these areas would require minimal removal of surface concrete or other structural material.

Decontamination of Centrifuges

The centrifuges would be processed through a specialized decontamination facility. The following operations would be performed:

- Removal of external fittings.
- Removal of bottom flange, motor and bearings, and collection of contaminated oil.
- Removal of top flange, and withdrawal and disassembly of internals.
- Degreasing of items as required.
- Decontamination of all recoverable items for smelting.
- Destruction of other classified portions by shredding, crushing, smelting, etc.

2.1.9 DUF_6 Disposition Options

At full production, the proposed NEF would generate 7,800 metric tons per year (8,600 tons per year) of DUF_6. Initially, the DUF_6 would be stored in Type 48Y cylinders (UBC) on the UBC Storage Pad (LES, 2004a). Each Type 48Y cylinder would hold approximately 12.5 metric tons (13.8 tons), which means that the site, at full production, would generate approximately 627 cylinders of DUF_6 every year. During the operation of the facility, the plant could generate and store up to 15,727 cylinders of DUF_6. The facility would maintain the UBCs while they are in storage. Maintenance activities would include periodic inspections for corrosion, valve leakage, or distortion of the cylinder shape, and touch-up painting as required. Problem cylinders would be removed from storage and the material transferred to another storage cylinder. The proposed storage area would be kept neat and free of debris, and all stormwater or other runoff would be routed to the UBC Storage Pad Stormwater Retention Basin for monitoring and evaporation.

Classification of DUF_6

The U.S. Department of Energy (DOE) has evaluated a number of alternative and potential beneficial uses for DUF_6 (DOE, 1999b; Brown et al, 1997). However, the current DUF_6 consumption rate is low compared to the existing DUF_6 inventory (DOE, 1999b), and the potential for a significant commercial market for the DUF_6 to be generated by the proposed NEF is considered to be low. The NRC has assumed that the excess DOE and commercial inventory of DUF_6 would be disposed of as waste (NRC, 1995).

For the purpose of this Draft EIS, the NRC considers the DUF_6 generated by the proposed NEF to be a Class A low-level radioactive waste as defined in 10 CFR § 61.55(a)(6).

What is Class A Low-level Radioactive Waste?

Low-level radioactive waste is defined by what it is not; that is, material classified as low-level radioactive waste does not meet the criteria of high-level radioactive waste, transuranic waste, or mill tailings. Low-level radioactive waste represents about 90 percent of all radioactive wastes, by volume. It includes ordinary items such as cloth, bottles, plastic, wipes, etc. that become contaminated with some radioactive material. These wastes can be generated anywhere radioisotopes are produced or used -- in nuclear power stations, local hospitals, university research laboratories, etc.

For regulatory purposes, there are 3 classes of low-level radioactive wastes. The NRC classifies low-level radioactive waste as Class A, Class B, or Class C based on the concentration of certain long-lived radionuclides as shown in Tables 1 and 2 of 10 CFR § 61.55 and the physical form and stability requirements set forth in 10 CFR § 61.56. Waste that contains the smallest concentration of the identified radionuclides and meets the stability requirement is considered Class A waste and could be considered for near-surface disposal. Classes B and C wastes contain greater concentrations of radionuclides with longer half-lives, and have stricter disposal requirements than Class A.

Sources: 10 CFR § 61.55 and 61.56

All DUF_6 would be disposed of before the site is decommissioned (LES, 2004a). This Draft EIS evaluates in detail two DUF_6 disposition options. These options are described in the following subsections, and Chapter 4 discusses their potential environmental impacts. Section 2.2 discusses additional DUF_6 disposition options but, for the reasons discussed in that section, these options are not evaluated in detail.

The Defense Nuclear Facilities Safety Board has reported that long-term storage of DUF_6 in the UF_6 form represents a potential chemical hazard if not properly managed (DNFSB, 1995). For this reason, alternatives for the strategic management of depleted uranium include the conversion of DUF_6 stock to a more stable uranium oxide (e.g., triuranium octaoxide [U_3O_8]) form for long-term management (OECD, 2001). DOE also evaluated multiple disposition options for DUF_6 and agreed that conversion to U_3O_8 was preferable for long-term storage and disposal of the depleted uranium due to its chemical stability (DOE, 2000b). Therefore, all the options evaluated in the Draft EIS include conversion of the DUF_6 to U_3O_8.

Two plausible options are proposed for disposition of DUF_6. The first option would be to ship the material to a private conversion facility prior to disposal (Option 1). An alternative available under the provisions of the USEC Privatization Act of 1996 would be to ship the material to the DOE's conversion facility at Portsmouth, Ohio, or Paducah, Kentucky, for temporary storage and eventual processing by the DOE conversion facility prior to disposal by DOE (Option 2). DOE has issued two final environmental impact statements to construct and operate a conversion facility at Paducah, Kentucky, and Portsmouth, Ohio (DOE, 2004a; DOE, 2004b). Additionally, DOE has issued two Records of Decision and construction of the conversion facilities began in July 2004 (DOE, 2004c; DOE, 2004d). Figure 2-12 shows the disposal flow paths for DUF_6 evaluated in this Draft EIS.

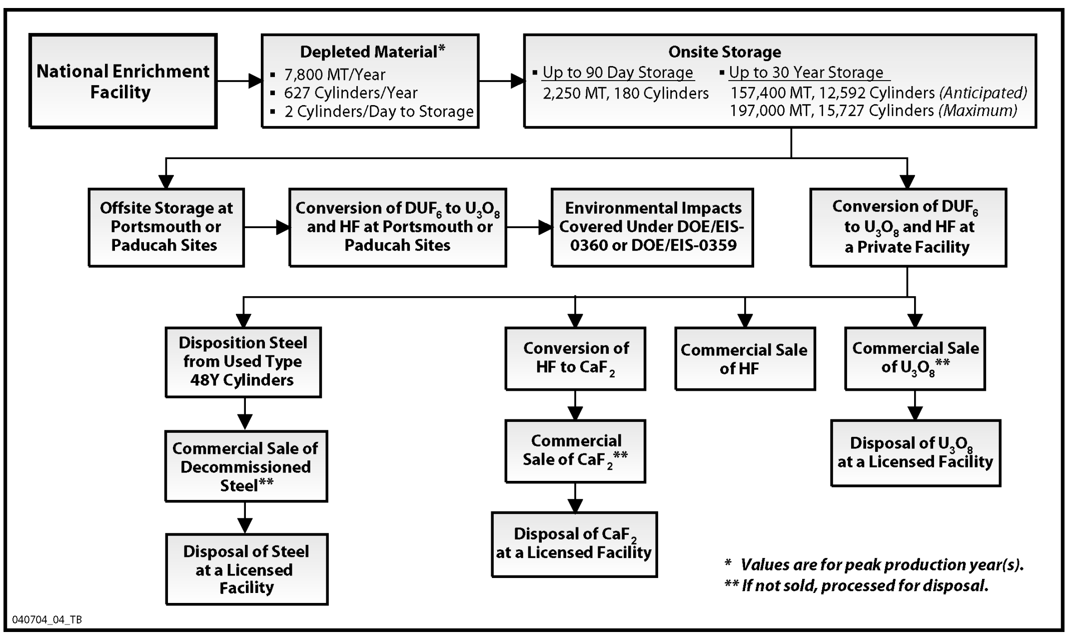


Figure 2-12 Disposal Flow Paths for DUF_6

In this Draft EIS, it is assumed that the proposed conversion facility would be using the same technology adapted for use by DOE in its conversion facilities. This technology would apply a continuous dry-conversion process based on the commercial process used by Framatome Advanced Nuclear Power, Inc., fuel fabrication facility in Richland, Washington (DOE, 2004a; DOE, 2004b; LES, 2004a).

Conversion of UF_6 to U_3O_8 generates hydrogen fluoride gas. This gas is dissolved in water to form hydrofluoric acid which is easier to store and handle than the hydrogen fluoride gas. The hydrofluoric acid could be sold to a commercial hydrofluoric acid supplier for reuse if the radioactive content is below free release limits, or it could be converted to calcium fluoride (CaF_2) for sale or disposal. Because conversion of the large quantities of DUF_6 at the DOE Portsmouth and Paducah Gaseous Diffusion Plant sites would be occurring at the same time the proposed NEF would be in operation, it is not certain that the market for hydrofluoric acid and calcium fluoride would allow for the economic reuse of the material generated by the proposed NEF (DOE, 2000a; DOE, 2000b). Therefore, only immediate neutralization of the hydrofluoric acid by conversion to calcium fluoride with disposal at a licensed low-level radioactive waste disposal facility is considered in this analysis. Descriptions of the options are set forth below.

Waste Classification of Depleted Uranium

Depleted uranium is different from most low-level radioactive waste in that it consists mostly of long-lived isotopes of uranium, with small quantities of thorium-234 and protactinium-234. Additionally, in accordance with 10 CFR Parts 40 and 61, depleted uranium is a source material and, if treated as a waste, it would fall under the definition of a low-level radioactive waste per 10 CFR § 61.55(a). This means that it could be disposed of in a licensed low-level radioactive waste facility if it is in a suitably stable form and meets the performance requirements of 10 CFR Part 6l. Therefore, under 10 CFR § 61.55(a), depleted uranium is a Class A low-level radioactive waste.

Source: NRC, 1991.

Option 1: Private Sector Conversion and Disposal

This disposition option is private sector conversion of the DUF_6 into U_3O_8 and hydrogen fluoride, disposal of the depleted U_3O_8, and possible commercial sale of the hydrofluoric acid. The conversion could occur within the region of influence of the proposed NEF or at some other site within the United States. Since no company has agreed to construct or operate a conversion facility within the region of influence of the proposed NEF, this Draft EIS considers that the private conversion facility could be located beyond the region of influence of the proposed NEF site (this is known as Option 1a). One potential location for a private conversion facility would be near the ConverDyn UF_6 generation facility in Metropolis, Illinois (LES, 2004a; LES, 2004b).

No private company has yet agreed to construct or operate a DUF_6 to U_3O_8 conversion facility anywhere in the United States. LES suggested the construction of a DUF_6 to U_3O_8 conversion facility near Metropolis, Illinois. The existing ConverDyn plant at Metropolis, Illinois, converts natural uranium dioxide (UO_2) (yellow cake) from mining and milling operations into UF_4 and UF_6 for feed to enrichment facilities such as the proposed NEF (Converdyn, 2004). Construction of a private DUF_6 to U_3O_8 conversion facility near the ConverDyn plant in Metropolis, Illinois, would allow the hydrogen fluoride produced during the DUF_6 to U_3O_8 conversion process to be reused to generate more UF_6 feed material while the U_3O_8 would be shipped for final dispositioning.

The NRC staff has determined that construction of a private DUF_6 to U_3O_8 conversion plant near Metropolis, Illinois, would have similar environmental impacts as construction of an equivalent facility anywhere in the United States. The advantage of selecting the Metropolis, Illinois, location is the proximity of the ConverDyn uranium dioxide to UF_6 conversion facility and, for the purposes of assessing impacts, the DOE conversion facility in nearby Paducah, Kentucky, for converting DOE-owned DUF_6 to U_3O_8. Because the proposed private plant would be similar in size and the effective area would be the same as the Paducah conversion plant, the environmental impacts would be similar. DOE has completed an EIS for the Paducah conversion facility which defines the impacts of the proposed DOE conversion facility (DOE, 2004a).

> ***DUF_6 Conversion Process***
>
> *DUF_6 conversion is a continuous process in which DUF_6 is vaporized and converted to U_3O_8 by reaction with steam and hydrogen in a fluidized-bed conversion unit. The hydrogen is generated using anhydrous ammonia, although an option of using natural gas is being investigated. Nitrogen is also used as an inert purging gas and is released to the atmosphere through the building stack as part of the clean off-gas stream. The depleted U_3O_8 powder is collected and packaged for disposition. The process equipment would be arranged in parallel lines. Each line would consist of two autoclaves, two conversion units, a hydrofluoric acid recovery system, and process off-gas scrubbers. The Paducah facility would have four parallel conversion lines. Equipment would also be installed to collect the hydrofluoric acid co-product and process it into any combination of several marketable products. A backup hydrofluoric acid neutralization system would be provided to convert up to 100 percent of the hydrofluoric acid to calcium fluoride for storage and/or sale in the future, if necessary.*
>
> *Source: (DOE, 2004a; DOE 2004b).*

The DUF_6 would be shipped from the proposed NEF site to the new conversion facility. The hydrofluoric acid produced by the conversion process could be re-used by ConverDyn in its existing hydrofluorination process to convert uranium dioxide ("yellowcake") to UF_6 (Converdyn, 2004). These assumptions bound the potential impacts of DUF_6 disposition. Once converted, U_3O_8 and the associated waste streams would be transported to a licensed low-level radioactive waste disposal facility for final disposition, as discussed below.

This Draft EIS also considers that the private conversion facility could be located close to the proposed NEF (this is known as Option 1b). This would involve a private sector company constructing and operating a new conversion facility close (within 6.4 kilometers [4 miles]) to the proposed NEF. By constructing and operating a private conversion facility in close proximity to the proposed NEF, the environmental impacts from the private conversion facility would affect the same area as the proposed NEF. Additionally, shipping and conversion of the depleted uranium could be accomplished within days of the filling of the Type 48Y cylinders, which would minimize the amount of DUF_6 stored onsite. The nearby conversion facility would be proportionally sized to meet the annual generation of 7,800 metric tons (8,600 tons) of DUF_6 per year. It is further assumed that the hydrofluoric acid generated at the adjacent conversion facility would not be marketable for reuse due to the large amount that would be available from the DOE conversion plants. The hydrofluoric acid would be converted to calcium fluoride for disposal at a licensed low-level radioactive waste disposal site.

Option 2: DOE Conversion and Disposal

DOE is constructing two conversion plants to convert the DUF_6 now in storage at Portsmouth, Ohio; Paducah, Kentucky; and Oak Ridge, Tennessee, to U_3O_8 and hydrofluoric acid. LES proposes to transport the DUF_6 generated by the proposed NEF to either of these new facilities and paying DOE to convert and dispose of the material. This plan is based on Section 3113 of the 1996 *United States Enrichment Corporation Privatization Act* that states the DOE "shall accept for disposal low-level radioactive waste, including depleted uranium if it were ultimately determined to be low-level radioactive waste, generated by [...] any person licensed by the Nuclear Regulatory Commission to operate a uranium enrichment facility under Sections 53, 63, and 193 of the *Atomic Energy Act of 1954* (42 U.S.C. 2073, 2093, and 2243)."

Disposal Options

Converted DUF_6 in the form of U_3O_8 can be considered a Class A low-level radioactive waste (NRC, 1991). Following conversion, the only currently available viable disposal option would be disposal of the depleted U_3O_8, based on its waste classification and site-specific evaluation, in a near-surface emplacement at a licensed low-level radioactive waste disposal facility within the borders of the United States. LES proposed disposal of the U_3O_8 in an abandoned mine as their preferred option but no existing mine is currently licensed to receive or dispose of low-level radioactive waste nor has any application been made to license such a facility. During its evaluation of disposal of the depleted uranium in a licensed low-level radioactive waste disposal facility, the NRC staff determined that, depending on the quantity of material to be deposited, additional environmental impact evaluations of the proposed disposal site may be required.

DOE recognizes that there could be commercial applications for the U_3O_8, and the possibility exists that other disposal options could become available in the future (after the satisfactory completion of appropriate NEPA or environmental review and licensing processes). If the U_3O_8 could be applied in a commercial application (e.g., as radiation shielding), then it would reduce the disposition impacts in proportion to the amount of U_3O_8 diverted to commercial applications. At this time, no viable commercial application for the material generated by the proposed NEF has been identified.

There are currently three active, licensed commercial low-level radioactive waste disposal facilities, all of which are located in Agreement States (licensing of the use and disposal of radioactive material is regulated by the State in accordance with agreements established with the NRC [NRC, 2003]). Additionally, DOE operates its own low-level radioactive waste disposal facility within the Nevada Test Site which is restricted to DOE-generated waste. Another company, Waste Control Specialists (WCS) is a commercial RCRA waste disposal facility located less than 3.2 kilometers (2 miles) east of the proposed NEF. WCS recently submitted an application to the State of Texas to allow the company to dispose of low-level radioactive waste (WCS, 2004). The following summarizes the disposal sites and the regions of the United States that can ship low-level radioactive waste to each site (NRC, 2003):

- Barnwell, located in Barnwell, South Carolina. Currently, Barnwell accepts waste from all U.S. generators except those in the Rocky Mountain and Northwest compacts. Beginning in 2008, Barnwell would only accept waste from the Atlantic Compact States (Connecticut, New Jersey, and South Carolina). Barnwell is licensed by the State of South Carolina to receive Class A, B, and C wastes. Because New Mexico is a member of the Rocky Mountain compact, the proposed NEF, at this time, would not be able to send low-level radioactive waste directly to Barnwell.

- Hanford, located in Hanford, Washington. Hanford accepts waste from the Northwest and Rocky Mountain compacts. Hanford is licensed by the State of Washington to receive Class A, B, and C wastes. New Mexico is a member of the Rocky Mountain compact, therefore, the proposed NEF would be able to ship low-level radioactive waste to Hanford for disposal.

- Envirocare, located in Clive, Utah. Envirocare accepts waste from all regions of the United States. Envirocare is licensed by the State of Utah for Class A waste only. Therefore, Envirocare is a disposal option for radioactive wastes generated at the proposed NEF.

- Nevada Test Site, located in southern Nye County, Nevada. The Nevada Test Site is a DOE disposal site for low-level radioactive waste from the various DOE sites and facilities across the United States. The Nevada Test Site was selected as the secondary disposal site for converted DUF_6 material generated at the Paducah, Kentucky, and Portsmouth, Ohio, DUF_6 conversion facilities (DOE, 2004a; DOE, 2004b). Because the Nevada Test Site is a DOE disposal site, it can not receive low-level radioactive wastes directly from private facilities such as the proposed NEF.

- Waste Control Specialists (WCS) disposal facility, located in Andrews County, Texas. The WCS disposal facility is less than 3.2 kilometers (2 miles) east of the proposed NEF site. This facility is currently licensed to dispose of RCRA hazardous waste and to temporarily store, but not dispose of, radioactive material under its current State of Texas Bureau of Radiation Control license L04971 (BRC, 2003). WCS recently submitted an application to the State of Texas to allow them to dispose of low-level radioactive waste (WCS, 2004). The application is for two separate facilities, a low-level radioactive waste disposal facility for the Texas Compact and a low-level radioactive waste and mixed low-level radioactive and hazardous waste Federal Waste Disposal Facility. Both the Compact Facility and Federal Waste Disposal Facility would be located within the boundaries of the WCS site in Andrews County, Texas.

  In 1980, Congress passed the “Low-Level Radioactive Waste Policy Act” which requires States to provide for disposal of low-level radioactive waste generated within their own borders. The States of Texas, Maine, and Vermont joined together to form the Texas Compact for disposal of low-level radioactive waste generated by the member States. If the August 2, 2004 application is approved, WCS would become the low-level radioactive waste disposal site for the Texas Compact. As previously stated for the Barnwell site, a disposal site within the Texas Compact can only accept waste generated by the compact member States. Thus, any radioactive wastes generated at the proposed NEF could not be shipped directly to WCS for disposal.

  The Low-Level Radioactive Waste Policy Act also allows for a Federal disposal facility to be co-located. The WCS application includes a request for a Federal Waste Disposal Facility to dispose of both low-level radioactive waste and mixed low-level radioactive and hazardous wastes from federal facilities such as the DOE. If the license application is approved, the WCS facility would be able to dispose of Class A, B, and C low-level radioactive and mixed wastes (WCS, 2004). Thus, the WCS waste disposal facility would be able to accept wastes similar to the waste currently accepted by Hanford, Envirocare, and Nevada Test Site. A Federal Waste Disposal Facility can only accept waste from Federal facilities, thus, the proposed NEF would not be able to ship depleted uranium directly to the proposed WCS facility.

The disposition of the U_3O_8 generated from the DOE conversion facilities would be at either the Envirocare site near Clive, Utah (the proposed disposition site), or the Nevada Test Site (optional disposal site) (DOE, 2004a; DOE, 2004b). Due to the need for separate regulatory actions to accomplish disposal at WCS, it is assumed that the U_3O_8 from the adjacent or offsite private conversion process would be disposed of at the Envirocare or Hanford disposal facilities.

2.2 Alternatives to the Proposed Action

This section examines the alternatives considered for the proposed action described in Section 2.1. The range of alternatives was determined by considering the underlying need and purpose for the proposed action. From this analysis, a set of reasonable alternatives was developed and the impacts of the proposed action were compared with the impacts that would result if a given alternative was implemented. These alternatives include:

- A no-action alternative under which the proposed NEF would not be constructed.
- An evaluation of alternative sites for the proposed NEF.
- A discussion of alternative conversion and disposition methods for $DUF_{6.}$
- A review of alternative technologies available for uranium enrichment.
- An evaluation of potential alternative sources of low-enriched uranium.

2.2.1 No-Action Alternative

The no-action alternative would be to not construct, operate, or decommission the proposed NEF in Lea County, New Mexico. The NRC would not approve the license application for the proposed NEF. Under the no-action alternative, the fuel-fabrication facilities in the United States would continue to obtain low-enriched uranium from the currently available sources. Currently, the only domestic source of low-enriched uranium available to fuel fabricators is from production of the Paducah Gaseous Diffusion Plant, the only operating uranium enrichment facility in the United States, and the downblending of highly enriched uranium under the "Megatons to Megawatts" program (USEC, 2003a). Foreign enrichment sources are currently supplying more than 85 percent of the U.S. nuclear power plants demand (EIA, 2004).

Currently, the "Megatons to Megawatts" program will expire by 2013, potentially eliminating downblending as a source of low-enriched uranium. Opened in 1952, the Paducah Gaseous Diffusion Plant utilizes gaseous diffusion technology (as described in Section 2.2.2.3) which is more energy intensive and requires higher energy consumption. These issues and factors such as new and more efficient enrichment technology (e.g., gas centrifuge) could lead to the eventual closure of the Paducah Gaseous Diffusion Plant. On the other hand, USEC could continue operation of the Paducah Gaseous Diffusion Plant to supply the needed low-enriched uranium.

Additional domestic enrichment facilities utilizing these more efficient technology in the future could be constructed. In this regard, USEC has announced its intention to construct and operate a uranium enrichment facility (i.e., proposed American Centrifuge Plant to be located near the Portsmouth Gaseous Diffusion Plant) which could supplement domestic and international demands (USEC, 2004a). The proposed American Centrifuge plant would have an initial annual production level of 3.5 million SWU by 2010. If the proposed American Centrifuge Plant begins operations, this would represent a more efficient and less costly means of producing low-enriched uranium.

At the same time, nuclear-generating capacity within the United States is expected to increase, causing an increase in demand for low-enriched uranium. Given the expected increase in demand and the possible elimination of low-enriched uranium from downblending, along with the uncertainty that any additional domestic supplies will be available, the no-action alternative could generate uncertainty regarding the availability of adequate, reliable domestic supplies of low-enriched uranium in the future.

2.2.2 Alternatives Considered but Eliminated

As required by NRC regulations, the NRC staff has considered other alternatives to the construction, operation, and decommissioning of the proposed NEF. These alternatives were considered but eliminated from further analysis due to economical, environmental, national security, or maturity reasons. This section discusses these alternatives and the reasons the NRC staff eliminated them from further consideration. These alternatives can be categorized as (1) an evaluation of alternative sites for the proposed NEF, (2) a discussion of alternative conversion and disposition methods for DUF_6, (3) a review of alternative technologies available for uranium enrichment, and (4) a review of potential alternative sources of low-enriched uranium.

2.2.2.1 Alternative Sites

The alternative sites considered in this Draft EIS are the result of the LES site-selection process. This section discusses the site-selection process and identifies the candidates sites for the proposed NEF and the criteria used in the selection process. The LES undertook a site-selection process to identify viable locations for the proposed NEF (LES, 2004a). This evaluation process yielded six finalist sites which are reviewed below. Figure 2-13 shows the six finalist sites for the proposed NEF.

Because many environmental impacts can be avoided or significantly reduced through proper site selection, the NRC staff evaluated the LES site-selection process to determine if a site considered by LES was obviously superior to the proposed NEF.

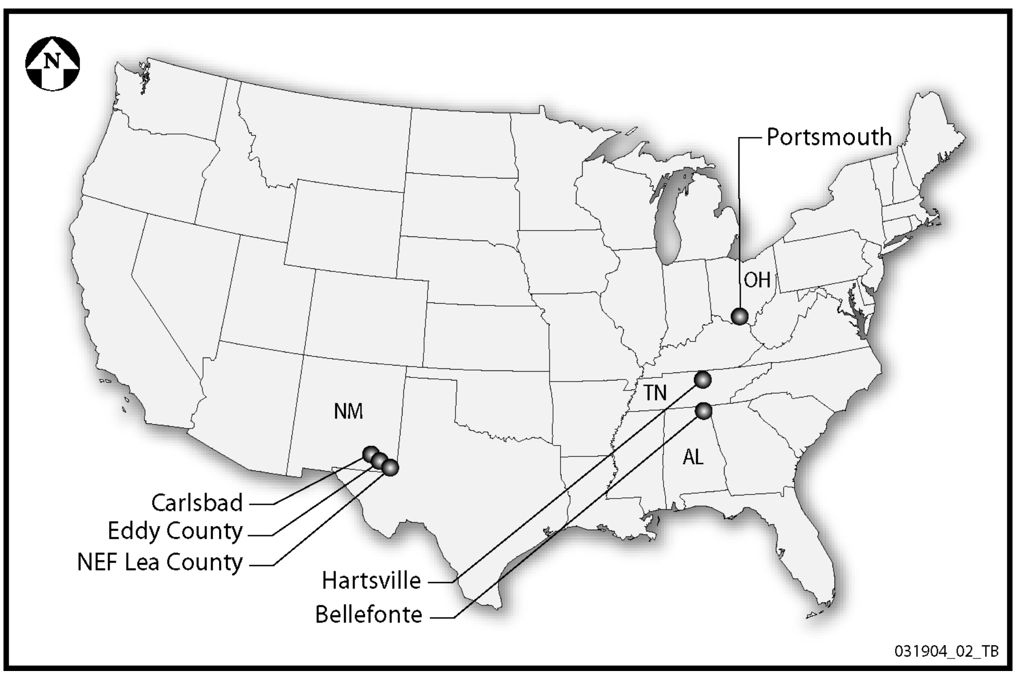


Figure 2-13 Six Final Potential NEF Sites

LES Site-Selection Process

LES evaluated 44 sites throughout the United States. The site-selection process used to locate a suitable site for construction and operation of the proposed NEF was based on various technical, safety, economic, and environmental factors. A multi-attribute-utility-analysis methodology was used for site selection that incorporated all of these factors to assess the relative benefits of a site with multiple, often competing, objectives or criteria. Figure 2-14 is a schematic of the LES site-selection process.

Forty-four potential sites were reviewed for possible analysis in the initial screening phase of the process. Twenty-nine sites were eliminated due to a lack of available environmental information or because they were located next to an operating commercial nuclear power plant. Sites in proximity to operating nuclear power plants would require enhanced security measures (LES, 2004a). The initial screening included the following criteria:

- Availability of adequate site information.
- Location of proposed site for ease of access and security.
- Acceptability of regional climate.

The outcome of the initial screening yielded 15 sites that met the first screening criteria. A second screening program was used to evaluate each of these 15 sites. This second screening program consisted of a “Go/No Go” analysis approach that compared the 15 semifinalist sites using the following criteria:

- Seismology/geology.
- Site characterization surveys.
- Size of plot.
- Land not contaminated.
- Moderate climate.
- Redundant electrical power.

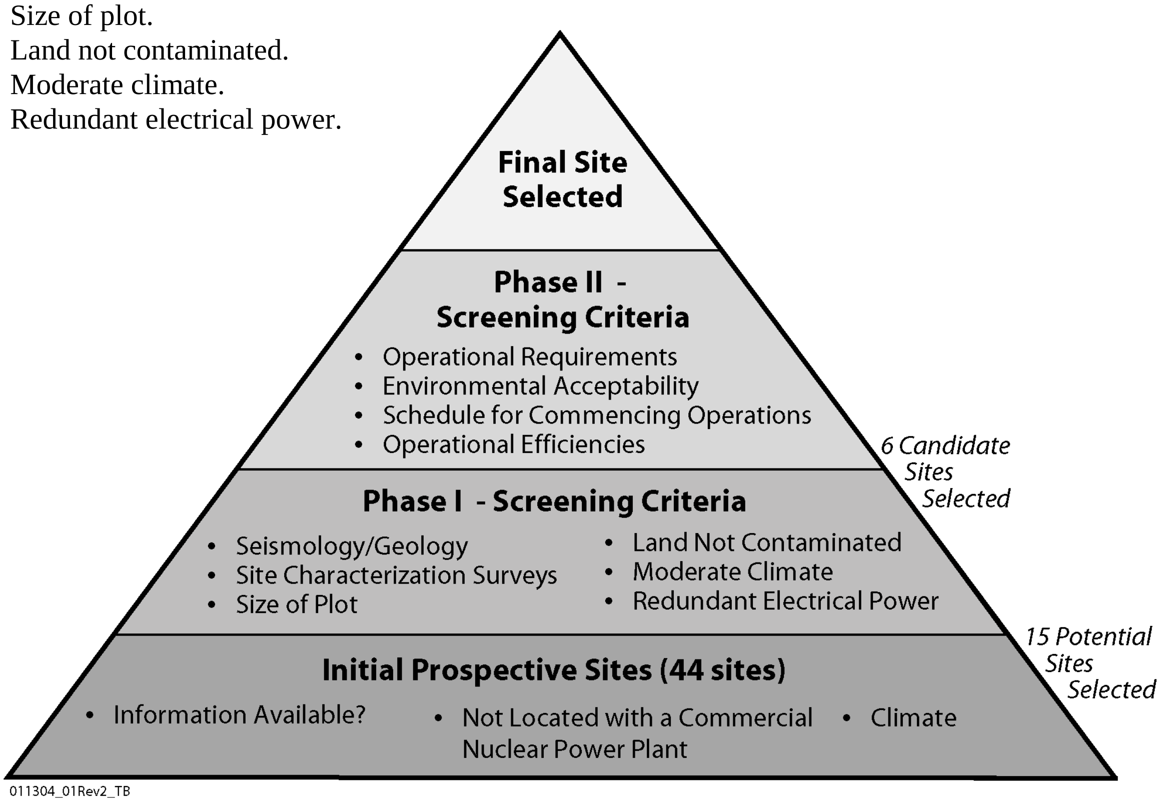


Figure 2-14 LES Site Selection Process (LES, 2004a)

The sites that met all these first-phase screening criteria were further evaluated in the second-phase screening. The second-phase approach in the LES site-selection process involved more detailed analysis using weighted criteria as well as more specific subcriteria for the first-phase criteria. The second-phase screening criteria were placed into the following four site-evaluation categories or objectives:

1. Operational Requirements weighting factor = 100
2. Environmental Acceptability weighting factor = 80
3. Schedule for Commencing Operations weighting factor = 70
4. Operational Efficiencies weighting factor = 60

Table 2-7 presents the 15 potential sites formally evaluated against the first-phase screening criteria and the results of the evaluation for each site.

Six of the sites met all of the first-phase criteria and were considered in the second-phase screening. These six candidate sites, shown in Figure 2-13, were Bellefonte, Alabama; Carlsbad, New Mexico; Eddy County, New Mexico; Hartsville, Tennessee; Lea County, New Mexico; and Portsmouth, Ohio.

Each of the final six locations underwent a detailed evaluation to identify the best location for the proposed NEF. The results of this evaluation are summarized below.

A sensitivity analysis was conducted after the initial analysis to ensure that the site selection was not sensitive to small changes in the relative weights of objectives or criteria. The sensitivity analysis also helped demonstrate how sites compare to each other. In the sensitivity analysis, the weighting factor for each criterion was adjusted to the minimum and maximum extreme of the weighting scale while the raw score was kept the same. The final score of the site was then reviewed to determine how much it changed (LES, 2004a).

Table 2-7 Summary of First-Phase Evaluation

Potential Site	Reasons for Elimination	Results of Screening
Ambrosia Lake, New Mexico	Earthquake risk.	✖
Barnwell, South Carolina	Earthquake risk.	✖
Bellefonte, Alabama	Met all phase I screening criteria.	✔
Carlsbad, New Mexico	Met all phase I screening criteria.	✔
Clinch River Industrial Site, Tennessee	Earthquake risk. Site not large enough.	✖
Columbia, South Carolina	Earthquake risk. Site impacted by a 500-year flood plain.	✖
Eddy County, New Mexico	Met all phase I screening criteria.	✔
Erwin, Tennessee	Site not large enough.	✖
Hartsville, Tennessee	Met all phase I screening criteria.	✔
Lea County, New Mexico	Met all phase I screening criteria.	✔
Metropolis, Illinois	Earthquake risk. Site not large enough.	✖
Paducah, Kentucky	Earthquake risk.	✖
Portsmouth, Ohio	Met all phase I screening criteria.	✔
Richland, Washington	Earthquake risk.	✖
Wilmington, North Carolina	Site not large enough.	✖

✔ Denotes candidate site status.
Source: LES, 2004a.

Description of Alternative Sites

Eddy County, New Mexico, Site

The Eddy County site scored highest in the multi-attribute-utility-analysis ranking but, due to potential problems with transferring ownership of the site from the BLM to LES, the site is not the preferred location for the proposed NEF. Federal regulations (43 CFR § 2711.1.3) require that any BLM land currently leased or permitted cannot be sold until the lease or permit holder is given two years' prior notification (Sorensen, 2004). Because the Eddy County site is currently leased for cattle grazing, it cannot be transferred to LES for at least two years. This two-year period can be waived by the leaseholder or it may run concurrently with preparation of the EIS. However, this could delay the start of construction of the facility and lowered the multi-attribute-utility-analysis ranking of the site (LES, 2004a).

Lea County, New Mexico, Site

Lea County ranked second in the multi-attribute-utility-analysis assessment. It is the preferred LES site for the proposed NEF. Two adjacent sites in Lea County were considered, and the evaluation is applicable to both. The preferred Lea County site consists of 220 hectares (543 acres) in Section 32 of range 38E in Township 21S of the New Mexico Meridian. The alternative Lea County site is 182 hectares (452 acres) in Section 33 of range 38E in Township 21S, which is east of and adjacent to Section 32. The area is in an air-quality attainment zone, and no air-permitting constraints are identified. Because the Lea County site is the preferred site for construction of the proposed NEF, Chapter 3 presents a complete description of the site (LES, 2004a).

Bellefonte, Alabama, Site

The Bellefonte site scored third in the multi-attribute-utility-analysis assessment and is considered an acceptable location for installation of the proposed NEF. However, part of the site is within the historic boundaries of a Cherokee Indian Reservation which may necessitate a historical preservation assessment. Additionally, high-voltage transmission lines cross the site and would have to be relocated before beginning construction. The historical preservation assessment and costly relocation of transmission lines lowered Bellefonte's ranking (LES, 2004a).

Hartsville, Tennessee, Site

The Hartsville site ranked fourth in the multi-attribute-utility-analysis assessment. The major drawback was the business climate in the State of Tennessee and the requirement to rezone the site. The site scored well in environment, labor, and transportation issues. On September 9, 2002, LES identified the Hartsville, Tennessee, site as a location for a uranium enrichment plant. However, because LES was unable to obtain local approval to rezone the site (LES, 2004a), the overall site score was reduced.

Portsmouth, Ohio, Site

The Portsmouth site ranked fifth of the six sites in the multi-attribute-utility-analysis assessment. Contamination on an existing firing range would have to be remediated, and existing waterways and ponds would have to be filled or relocated to make the site useable. Due to the proposed construction of the American Centrifuge Plant by USEC in the same immediate area, the finalization of an agreement between DOE, USEC, and LES would be difficult and would delay construction of the facility, thus lowering the overall score.

Carlsbad, New Mexico, Site

The Carlsbad site ranked sixth in the evaluation. The area around the proposed Carlsbad site contains both active and abandoned facilities including potash mining and oil-field welding services. This creates the possibility that the site soil is contaminated with oils, solvents, and industrial waste products. This potential contamination requires further investigations and surveys prior to selecting the Carlsbad site for the facility. No detailed geological surveys have been completed for the site. However, the general area is geologically and seismically stable and acceptable for construction of the proposed NEF. While no wetlands exist on the site, a dry arroyo, Lone Tree Draw, runs through the site which could require obtaining additional environmental approvals.

An Xcel Energy transmission line passes near the northwest corner of the proposed site. LES would have to pay for a new substation on the main line and new secondary feeder lines from alternate transmission lines to provide a redundant power supply for the site. The potential for soil contamination would make site decommissioning and decontamination more difficult, and the potential for environmental justice issues lowered Carlsbad's overall score.

Conclusion

Based on the above assessment, the NRC staff has determined that the LES site selection process has a rational, objective structure and appears reasonable. None of the candidate sites were obviously superior to the LES preferred site in Lea County, New Mexico; therefore no other site was selected for further analysis.

2.2.2.2 Alternative Sources of Low-Enriched Uranium

The NRC staff examined two alternatives to fulfill the domestic enrichment needs. These alternatives, as shown below, were eliminated from further consideration.

Re-Activate Portsmouth Gaseous Diffusion Facility

USEC closed the Portsmouth Gaseous Diffusion Plant in May 2001 to reduce operating costs (DOE, 2003). USEC cited long-term financial benefits, more attractive power price arrangements, operational flexibility for power adjustments and a history of reliable operations as reasons for choosing to continue operations at the Paducah Gaseous Diffusion Plant. In its June 2000 press release, USEC explained that they "...clearly could not continue to operate two production facilities." Key business factors in USEC's decision to reduce operations to a single production plant included long-term and short-term power costs, operational performance and reliability, design and material condition of the plants, risks associated with meeting customer orders on time, and other factors relating to assay levels, financial results, and new technology issues (USEC, 2000).

The NRC staff does not believe that there has been any significant change in the factors that were considered by USEC in its decision to cease uranium enrichment at Portsmouth. In addition, the gaseous diffusion technology (as described in Section 2.2.2.3) is more energy intensive than gas centrifuge. The higher energy consumption results in larger indirect impacts, especially those impacts which are attributable to significantly higher electricity usage (e.g., air emissions from coal-fired electricity generation plants) (DOE, 1995). Therefore, this proposed alternative was eliminated from further consideration.

Purchase Low-Enriched Uranium From Foreign Sources

There are several potential sources of enrichment services worldwide. However, U.S. reliance on foreign sources of enrichment services, as an alternative to the proposed action, would not meet the U.S. national energy policy objective of a "...viable, competitive, domestic uranium enrichment industry for the foreseeable future" (DOE, 2000a). For this reason, the NRC staff does not consider this alternative action to meet the purpose and need for the proposed action, and this alternative was eliminated from further studies.

2.2.2.3 Alternative Technologies for Enrichment

A number of different processes have been invented for enriching uranium but only two have been proven suitable for commercial and economic use. Only the gaseous diffusion process and the gas centrifuge technology have reached the maturity needed for industrial use. Other technologies—namely the Electromagnetic Isotope Separation Process, Liquid Thermal Diffusion, and a laser enrichment process—have proven too costly to operate or remain at the research and laboratory developmental scale and have yet to prove themselves to be economically viable.

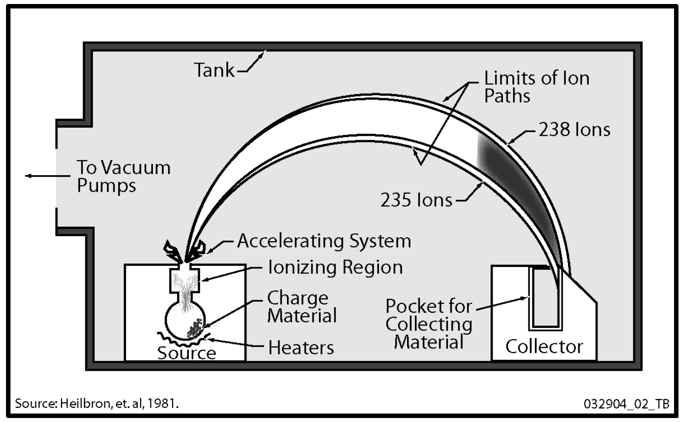


Figure 2-15 Sketch of Electromagnetic Isotopic Separation Process (Heilbron et al., 1981)

Electromagnetic Isotope Separation Process

Figure 2-15 shows a sketch of the electromagnetic isotopic separation process. In the Electromagnetic Isotope Separation Process, or calutron, a monoenergetic beam of ions of normal uranium travels between the poles of a magnet. The magnetic field causes the beam to split into several streams according to the mass of the isotope. Each isotope has a different radius of curvature and follows a slightly different path. Collection cups at the ends of the semicircular trajectories catch the homogenous streams. Because the energy requirements for the calutrons proved very high—in excess of 3,000 kilowatt hour per SWU—and the production was very slow (Heilbron et al., 1981), this process was removed from further consideration.

Liquid Thermal Diffusion

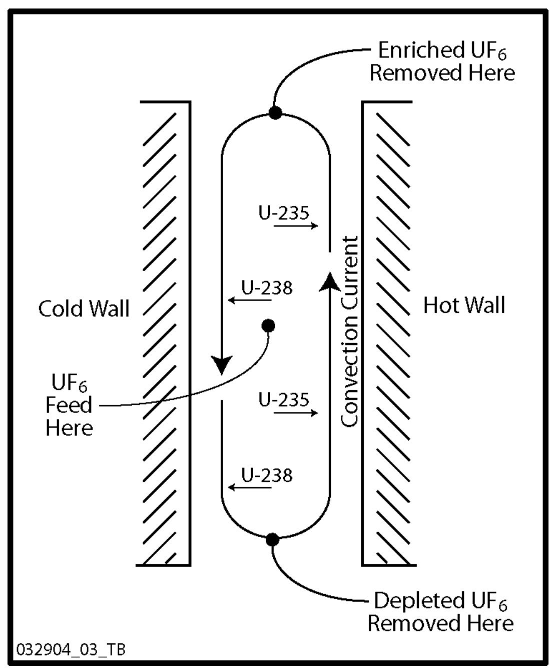


Figure 2-16 Liquid Thermal Diffusion Process

Liquid thermal diffusion process was investigated in the 1940's. Figure 2-16 is a diagram of the liquid thermal diffusion process. It is based on the concept that a temperature gradient across a thin layer of liquid or gas causes thermal diffusion that separates isotopes of differing masses. When a thin, vertical column is cooled on one side and heated on the other, thermal convection currents are generated and the material flows upward along the heated side and downward along the cooled side. Under these conditions, the lighter $^{235}UF_6$ molecules diffuse toward the warmer surface, and heavier $^{238}UF_6$ molecules concentrate near the cooler side. The combination of this thermal diffusion and the thermal convection currents causes the lighter ^{235}U molecules to concentrate on top of the thin column while the heavier ^{238}U goes to the bottom. Taller columns produce better separation. Eventually, a facility was designed and constructed at Oak Ridge, Tennessee, but it was closed after about a year of operation due to cost and maintenance (Settle, 2004). Based on high operating costs and high maintenance requirements, the liquid thermal diffusion process has been eliminated from further consideration.

Gaseous Diffusion Process

The gaseous diffusion process is based on molecular effusion, a process that occurs whenever a gas is separated from a vacuum by a porous barrier. The gas passes through the holes because there are more "collisions" with holes on the high-pressure side than on the low-pressure side (i.e., the gas flows from the high-pressure side to the low-pressure side). The rate of effusion of a gas through a porous barrier is inversely proportional to the square root of its mass. Thus, lighter molecules pass through the barrier faster than heavier ones. Figure 2-17 is a diagram of a single gas diffusion stage.

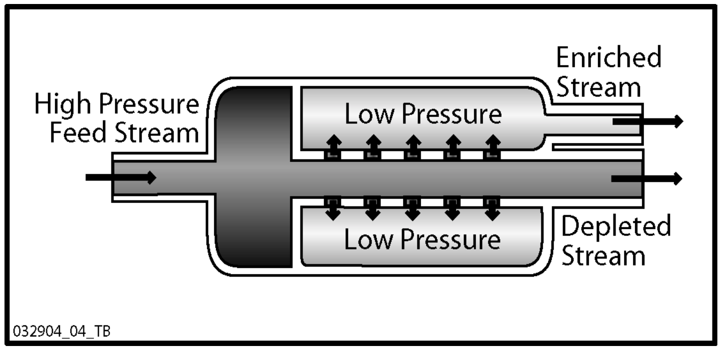


Figure 2-17 Gaseous Diffusion Stage (Urenco, 2003)

The gaseous diffusion process consists of thousands of individual stages connected in series to multiply the separation factor. The gaseous diffusion plant in Paducah, Kentucky, contains 1,760 enrichment stages and is designed to produce UF_6 enriched up to 5.5 percent ^{235}U. The design capacity of the Paducah Gaseous Diffusion Plant is approximately 8 million SWU per year, but it has never operated at greater than 5.5 million SWU. Paducah consumes approximately 2,200 kilowatt hours per kilogram of separative work unit, which is less than the electromagnetic isotopic separation process or liquid thermal diffusion process but still higher than the 40 kilowatt hours per kilogram of separative work unit possible in modern gas centrifuge plants (DOE, 2000a; Urenco, 2004a). The gaseous diffusion process is 50-year-old technology that is energy intensive and has been eliminated from further consideration.

Laser Separation Technology

Laser separation technology encompasses two known developmental technologies that have yet to reach the maturity stage for industrial use. These are the Atomic Vapor Laser Isotope Separation and the Separation of Isotopes by Laser Excitation processes.

The Atomic Vapor Isotope Separation process is based on different isotopes of the same element, while chemically identical, having different electronic energies and therefore absorbing different colors of laser light. The isotopes of most elements can be separated by a laser-based process if they can be efficiently vaporized into individual atoms. In Atomic Vapor Isotope Separation enrichment, uranium metal is vaporized and the vapor stream is illuminated with a laser light of a specific wavelength that is absorbed only by ^{235}U. The laser selectively adds enough energy to ionize or remove an electron from ^{235}U atoms while leaving the other isotopes unaffected. The ionized ^{235}U atoms are then collected on negatively charged surfaces inside the separator unit. The collected material (enriched product) is condensed as liquid on the charged surfaces and then drains to a caster where it solidifies as metal nuggets. Figure 2-18 is a diagram of the Atomic Vapor Isotope Separation process (LLNL, 2004). In June 1999, citing budget constraints, USEC stopped further development of the Atomic Vapor Isotope Separation program (USEC, 1999).

The Separation of Isotopes by Laser Excitation technology, developed by the Australian Silex Systems Ltd., uses a similar process to the Atomic Vapor Isotope Separation process. The Separation of Isotopes by Laser Excitation process uses UF_6 vapor that passes through a tuned laser and an electromagnetic field to separate the $^{235}UF_6$ from the $^{238}UF_6$. The process is still under development and will not be ready for field trials for several years. USEC ended its support of the Separation of Isotopes by Laser Excitation program on April 30, 2003, in favor of the proposed American Centrifuge Plant (USEC, 2003b).

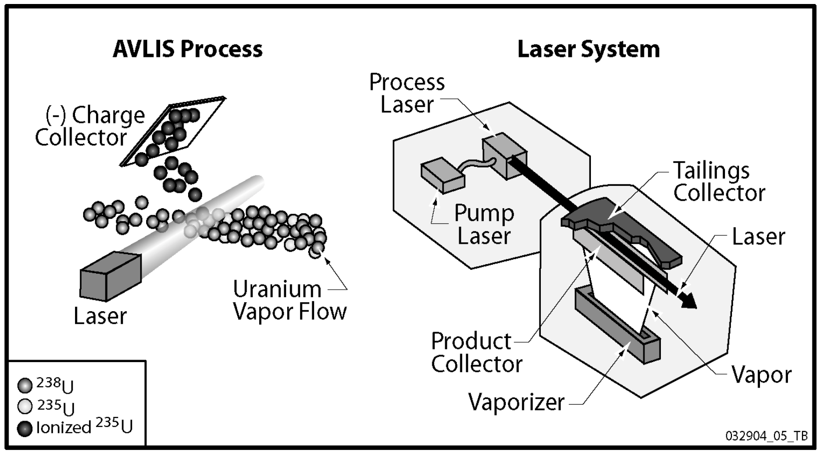


Figure 2-18 AVLIS Process (LLNL, 2004)

Because neither the Atomic Vapor Isotope Separation process nor the Separation of Isotopes by Laser Excitation process is ready for commercial production of low-enriched uranium, these processes have been eliminated from further consideration.

Conclusion

The NRC considered the feasibility of utilizing alternative methods for producing low-enriched uranium. Gas centrifuge and liquid thermal diffusion technology would be far more costly then the centrifuge technology proposed. The other technologies reviewed–electromagnetic isotope separation process and laser separation technology–have not been sufficiently developed for commercial application. Accordingly, these technologies were not considered reasonable alternatives.

2.2.2.4 Alternatives for DUF_6 Disposition

In addition to the DUF_6 disposition options discussed in Section 2.1.9, other alternatives for dispositioning the DUF_6 include (1) storage of the DUF_6 onsite in anticipation of future use as a resource and (2) continuous conversion of the DUF_6 to U_3O_8 and storage of the oxide as a potential resource. In addition, DOE has evaluated the potential impacts of various disposition options in its “Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride” (DOE, 1999b). These include (1) storage as DUF_6 for up to 40 years, (2) long-term storage as depleted U_3O_8, (3) use of depleted U_3O_8, and (4) use of uranium metal.

The Programmatic EIS evaluated the potential environmental impacts of disposal in shallow earthen structures, below-grade vaults and underground mines. LES also proposed three additional alternatives for DUF_6 disposition that include Russian re-enrichment, French conversion or re-enrichment, and Kazakhstan conversion. Due to costs, the NRC staff does not consider these alternatives to be viable; therefore, they are not discussed further in this Draft EIS. Figure 2-12 shows the disposition flow paths considered by the NRC staff in this Draft EIS.

The following subsections discuss the other DUF_6 disposition alternatives in two broad categories—use of DUF_6 and conversion at existing fuel fabrication facilities—and the reasons these alternatives are not evaluated in detail in this Draft EIS.

Use of DUF_6

As discussed above, the NRC staff views DUF_6 as a potential resource with very limited use. If storage of DUF_6 beyond 30 years occurs, then the impacts described in Chapter 4 of this Draft EIS would be extended for that storage period. If a viable use for DUF_6 is found, it could reduce the environmental impacts associated with its disposition. However, the likelihood of a significant commercial market for the DUF_6 generated by the proposed NEF site is considered to be low.

DOE has evaluated a number of alternatives and potentially beneficial uses for DUF_6, and some of these applications have the potential to use a portion of the existing DUF_6 inventory (DOE, 1999b; Brown et al., 1997). However, the current DUF_6 consumption rate is low compared to the DUF_6 inventory (DOE, 1999b), and the NRC has assumed that excess DOE and commercial inventory of DUF_6 would be disposed of as a waste product (NRC, 1995).

The NRC staff has determined that unless LES can demonstrate a viable use, the DUF_6 generated by the proposed NEF should be considered a waste product. Because the current available inventory of depleted uranium in the form of metal (UF_6 and U_3O_8) is in excess of the current and projected future demand for the material, this Draft EIS will not further evaluate DUF_6 disposition alternatives involving its use as a resource, including continued storage at the proposed NEF site for more than 30 years in order to be used in the future.

Beneficial Uses of Depleted Uranium

Some historical beneficial uses for depleted uranium:

- *Further enrichment – DOE originally undertook the long-term storage of DUF_6 because it can be used in the future as feed for further enrichment. The low cost of uranium ore and postponed deployment of advanced enrichment technology have indefinitely delayed this application.*
- *Nuclear reactor fuel – depleted uranium oxide can be mixed with plutonium oxide from nuclear weapons to make mixed oxide fuel (typically about 6 percent plutonium oxide and 94 percent depleted uranium oxide) for commercial power reactors.*
- *Down-blending high-enriched uranium – Nuclear disarmament allows the down-blending of some weapons-grade highly enriched uranium with depleted uranium to make commercial reactor fuel.*
- *Munitions – depleted uranium metal can be used for tank armor and armor-piercing projectiles. This demand is decreasing as environmental regulations become more complex.*
- *Biological shielding – depleted uranium metal has a high density, which makes it suitable for shielding from x-rays or gamma rays for radiation protection.*
- *Counterweights – Because of its high density, depleted uranium has been used to make small but heavy counterweights such as in the aircraft industry.*

Source: DOE 1999b; Brown et al., 1997.

Conversion at Existing Fuel Fabrication Facilities

Another potential alternative disposition strategy would be to perform the conversion of DUF_6 to U_3O_8 at an existing fuel-fabrication facility. The existing fuel-fabrication facilities are Global Nuclear Fuel-Americas, LLC, in Wilmington, North Carolina; Westinghouse Electric Company, LLC, in Columbia, South Carolina; and Framatome ANP, Inc., in Richland, Washington. These facilities have existing processes and conversion capacities. They also use Type 30B cylinders. Therefore, the existing fuel-fabrication facilities would need to install new equipment to handle the larger Type 48Y cylinders. The facilities would probably need to install separate capacity to process the DUF_6 to avoid quality control issues related to processing enriched UF_6. The facilities would also need to manage and dispose of the hydrofluoric acid that would be generated from the conversion process. Furthermore, these existing facilities have not expressed an interest in performing these services, and the cost for the services would be difficult to estimate. For these reasons, this alternative is eliminated from further consideration in this Draft EIS.

Conclusion

Although DUF_6 does have alternative and beneficial uses, the current U.S. inventory is estimated to be approximately 480,000 metric tons of uranium (OECD, 2001), which far exceeds the existing and projected demand for the material. Consequently, the NRC staff has assumed that all of the DUF_6 to be generated by the proposed NEF would be converted to U_3O_8 and disposed of in a licensed disposal facility.

2.3 Comparison of Predicted Environmental Impacts

Chapter 4 of this Draft EIS presents a more detailed evaluation of the environmental impacts of the proposed action and the no-action alternative. Table 2-8 summarizes the environmental impacts for the proposed NEF and the no-action alternative.

2.4 Staff Preliminary Recommendation Regarding the Proposed Action

After weighing the impacts of the proposed action and comparing alternatives, the NRC staff, in accordance with 10 CFR § 51.71(e), sets forth its preliminary NEPA recommendation regarding the proposed action. The NRC staff recommends that, unless safety issues mandate otherwise, the proposed license be issued to LES. In this regard, the NRC staff has preliminarily concluded that the applicable environmental monitoring program described in Chapter 6 and the proposed mitigation measures discussed in Chapter 5 would eliminate or substantially lessen any potential adverse environmental impacts associated with the proposed action.

The NRC staff has preliminarily concluded the overall benefits of the proposed NEF outweigh the environmental disadvantages and costs based on consideration of the following:

- The need for an additional, reliable, economical, domestic source of enrichment services.

- The beneficial economic impacts of the proposed NEF on the local communities which have determined will be MODERATE.

- The remaining impacts on the physical environment and human communities would be small with the exception of short-term impacts associated with construction traffic, accidents, and waste management, which would be SMALL to MODERATE.

Table 2-8 Summary of Environmental Impacts for the Proposed NEF and the No-Action Alternative

Affected Environment	Proposed Action: *LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.*	No-Action Alternative: *The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.*
Land Use	SMALL. Construction activities would occur on about 81 hectares (200 acres) of a 220-hectare (543-acre) site that would be fenced. While the land is currently undisturbed except for an access road, CO_2 pipeline, and cattle grazing, there are sufficient lands surrounding the proposed NEF for relocation of the cattle grazing and the CO_2 pipeline.	SMALL. Under the no-action alternative, no local impact would occur because the proposed NEF would not be constructed or operated. The land use of cattle-grazing would continue and the property would be available for alternative use. There would also be no land disturbances. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed, with a likely impact on land use similar to the proposed action.

Affected Environment	**Proposed Action:** ***LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.***	**No-Action Alternative:** ***The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Historical and Cultural Resources	SMALL. Seven archaeological sites were recorded on the proposed site. All of these sites are considered potentially eligible for listing on the National Register of Historic Places. Two sites would be impacted by construction activities, and a third is located along the access road. Based on the terms and conditions of a Memorandum of Agreement that is being prepared, a historic properties treatment plan would be fully implemented prior to construction of the proposed NEF. Once measures from the treatment plan are implemented, adverse impacts would be mitigated.	SMALL to MODERATE. Under the no-action alternative, the land would continue to be used for cattle-grazing and historical and cultural resources would remain in place unaffected by the proposed action. Without the treatment plan and its mitigation measures proposed by LES, historical sites identified at the proposed NEF could be exposed to the possibility of human intrusion. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed at other sites and could have potential impacts to cultural resources. Impacts to historical and cultural resources would be expected to be SMALL to MODERATE, providing that requirements included in applicable Federal and State historic preservation laws and regulations are followed.

Affected Environment	**Proposed Action:** ***LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.***	**No-Action Alternative:** ***The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Visual and Scenic Resources	SMALL. Impacts from construction activities would be limited to fugitive dust emissions that can be controlled using dust-suppression techniques. The proposed NEF cooling towers could contribute to the formation of local fog less than 0.5 percent of the total number hours per year. The proposed NEF site received the lowest scenic-quality rating using the BLM visual resource inventory process.	SMALL. Under the no-action alternative, the visual and scenic resources would remain the same as described in the affected environment section. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed, with a likely impact on visual and scenic resources similar to the proposed action.

Affected Environment	**Proposed Action:** ***LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.***	**No-Action Alternative:** ***The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Air Quality	SMALL. Air concentrations of the criteria pollutants predicted for vehicle emissions and PM_{10} emissions for fugitive dust during construction would all be below the National Ambient Air Quality Standards, temporary, and highly localized. A NESHAP Title V permit would not be required for operations due to the low levels of estimated emissions.	SMALL. Under the no-action alternative, air quality in the general area would remain at its current levels described in the affected environment section. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed. Depending on the construction methods and design of these facilities, the likely impact on air quality would be similar to the proposed action.

Affected Environment	**Proposed Action:** ***LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.***	**No-Action Alternative:** ***The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Geology and Soils	SMALL. Construction-related impacts to soil would occur within the 81-hectare (200-acre) portion of the site that would contain the proposed NEF structures. Only onsite soils would be used during construction. No soil contamination would be expected during construction and operations although soil contamination could occur. A plan would be in place to address any spills that may occur during operations and any contaminated soil in excess of regulatory limits would be properly disposed of.	SMALL. Under the no-action alternative, the land would continue to be used for cattle-grazing. The geology and soils on the proposed site would remain unaffected because no land disturbance would be occur. Natural events such as wind and water erosion would remain as the most significant variable associated with the geology and soils of the site. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed, with a likely impact on geology and soils similar to the proposed action.

Affected Environment	Proposed Action: *LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.*	No-Action Alternative: *The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.*
Water Resources	SMALL. There are no existing surface water resources, and ground-water resources under the proposed NEF site are not considered potable or near the surface. NPDES general permits for construction and operations would be required to manage stormwater runoff. Construction-related impacts would be SMALL to both surface water and ground water. Retention basins (i.e., the Treated Effluent Evaporative Basin and the UBC Storage Pad Stormwater Retention Basin) would be lined to minimize infiltration of water into the subsurface. Infiltration from the Site Stormwater Detention Basin and septic systems' leach fields would be expected to form a perched layer on top of the Chinle Formation, but there would be limited downgradient transport due to soil-storage capacity and upward flux to the root zone. Operations impacts would be SMALL. Impacts on water use would be SMALL due to the availability of excess capacity in the Hobbs and Eunice water systems. The proposed NEF's use of Ogallala waters indirectly through the Eunice and Hobbs water-supply systems would constitute a small portion of the aquifer reserves in the New Mexico territory.	SMALL. Under the no-action alternative, water resources would remain the same as described in the affected environment section. Water supply demand would continue at current rate. The natural surface flow of stormwaters on the site would continue, and potential ground-water contamination could occur due to surrounding operations related to the oil industry. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed. Depending on these facilities, the likely impact on water resources including water usage would be similar to the proposed action.

Affected Environment	**Proposed Action:** ***LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.***	**No-Action Alternative:** ***The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Ecological Resources	SMALL. There are no wetlands or unique habitats for threatened or endangered plant or animal species on the proposed NEF site. There are no unique habitats on the site. Impacts from use of stormwater retention/detention basins would be SMALL. Animal-friendly fencing and netting over the basins (where appropriate) would be used to minimize animal intrusion. Revegetation using native plant species would be conducted in any areas impacted by construction, operation, and decommissioning activities.	SMALL. Under the no-action alternative, the land would continue to be used for cattle grazing and the ecological resources would remain the same as described in the affected environmental section. Land disturbances would also be avoided. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed. Potential impacts on ecological resources from these facilities could arise from activities associated with land disturbances of existing habitats.

Affected Environment	**Proposed Action:** ***LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.***	**No-Action Alternative:** ***The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Socio-economic	MODERATE. During the 8-year construction period, there would be an average of 397 jobs per year created (about 19 percent of the Lea, Andrews, and Gaines counties' construction labor force) with employment peaking at 800 jobs in the fourth year. Construction would cost $1.2 billion (2002 dollars). Spending on goods and services and wages would create 582 new jobs on average. About 15 percent of the construction work force would take up residency in the surrounding community, and about 15 percent of the local housing units are unoccupied. The impact to local schools would be SMALL. Gross receipts taxes paid by LES and local businesses could approach $3 million during the 8-year construction period. Income taxes during construction are estimated to be about $4 million annually. LES would employ 210 people annually during peak operations with an additional 173 indirect jobs with about $20 million in annual operations spending. Increase in demand for public services would be SMALL. Decommissioning would have a SMALL impact. Approximately 300 direct and indirect jobs at Paducah, Kentucky, or Portsmouth, Ohio, would be extended for 11 to 15 years, respectively, if DUF_6 conversion takes place at either site. If a private conversion facility is constructed, approximately 180 total jobs would be created.	MODERATE. Under the no-action alternative, socioeconomics in the local area would continue as described in the affected environmental section. Approximately 800 construction jobs during the peak construction years and 210 operational jobs would not be created. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed. Depending on the construction methods and design of these facilities, the likely socioeconomic impact would be similar to the proposed action. Long-term uncertainty in future supplies of low-enriched uranium could be affect without replacement enrichment capacity for the existing U.S. enrichment facility or from the potential ending of the "Megaton to Megawatts" program in 2013.

Affected Environment	**Proposed Action:** ***LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.***	**No-Action Alternative:** ***The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Environmental Justice	SMALL. The environmental justice study was chosen to encompass an 80-kilometer (50-mile) radius around the proposed NEF site. All population data, including information on minorities and low-income population, were obtained from the 2000 census data. Impacts would be SMALL and no disproportionately high adverse impacts would occur to minority and low-income populations living near the proposed NEF or along the transportation routes into and out of the proposed NEF.	SMALL. Under the no-action alternative, no changes to environmental justice issues other than those that may already exist in the community would occur. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed, with a likely impact on environmental justice concerns similar to the proposed action. No disproportionately high or adverse impacts would be expected.

Affected Environment	**Proposed Action:** ***LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.***	**No-Action Alternative:** ***The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Noise	SMALL. Noise levels would be predominately due to traffic noise. Construction and decommissioning activities could be limited to normal daytime working hours. The nearest residence would be 4.3 kilometers (2.6 miles) away from the proposed site, and noises at this distance from construction activities would be SMALL. Noise levels during operations would primarily be confined to inside buildings and would be within the U.S. Department of Housing and Urban Development guidelines.	SMALL. Under the no-action alternative, there would be no construction or operational activities or processes that would generate noise. Noise levels would remain as is currently observed at the site. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed. Depending on the construction methods and design of these facilities, the likely noise impact would be similar to the proposed action.

Affected Environment	**Proposed Action:** ***LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.***	**No-Action Alternative:** ***The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Transportation	SMALL to MODERATE during construction. Traffic on New Mexico Highway 234 would almost double during construction for a period of approximately two years, and three injuries and less than one fatality could occur during the peak construction employment year due to work force traffic. Peak truck traffic during construction could cause less than one injury and less than one fatality. SMALL during operations. Truck trips removing nonradioactive waste and delivering supplies would have a small impact on the traffic on New Mexico Highway 234. Work force traffic would also have a SMALL impact on New Mexico Highway 234 with less than one injury and less than one fatality annually due to traffic accidents. All truck shipments of feed, product, and waste materials would result in less than 1×10^{-2} latent cancer fatalities to the public and workers from direct radiation and two or less from vehicle emissions. All rail shipments of feed, product, and waste materials would result in less than 1×10^{-1} latent cancer fatalities to the public and workers from direct radiation and less than 7×10^{-2} from vehicle emissions during the life of the facility. SMALL to MODERATE during accidents. If a rail accident involving the shipment of DUF_6 occurs in an urban area, approximately 28,000 people could suffer	SMALL. Under no-action alternative, traffic volumes and patterns would remain the same as described in the affected environment section. The current volume of radioactive material and chemical shipments would not increase. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed, with a likely impact on transportation similar to the proposed action.

Affected Environment	**Proposed Action:** ***LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.***	**No-Action Alternative:** ***The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Public and Occupational Health	SMALL during construction and normal operations. During construction, there could be less than one fatality per year based on State statistics from the year 2002. Construction workers could receive up to 0.05 millisieverts (5 millirem) per year once proposed NEF operations are initiated. Precautions would be taken to prevent injuries and fatalities. During operations, there would be approximately eight injuries per year and no fatalities due to nonradiological occurrences based on statistical probabilities. A typical operations or maintenance technician could receive 1 millisievert (100 mrem) of radiation exposure annually. A typical cylinder yard worker could receive 3 millisievert (300 mrem) of radiation exposure annually. All public radiological exposures are significantly below the 10 CFR Part 20 regulatory limit of 1 millisieverts (100 millirem) and 40 CFR Part 190 regulatory limit of 0.25 millisieverts (25 millirem) for uranium fuel-cycle facilities. Members of the public who are located at least a few miles from the UBC Storage Pad would have annual direct radiation exposures combined with exposure through inhalation result in SMALL impacts significantly less than 0.01 millisieverts (1 millirem). SMALL to MODERATE for accidents. Although highly unlikely, the most severe accident is estimated to be the release of UF_6 caused by rupturing an over-filled and/or over-heated cylinder, which could incur a collective	SMALL. Under the no-action alternative, the public health would remain as described in the affected environment. No radiological exposure are estimated to the general public other than background levels. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed. Depending on the construction methods and design of these facilities, the likely public and occupation health impacts would be similar to the proposed action.

Affected Environment	**Proposed Action:** ***LES would construct, operate, and decommission the proposed NEF in Lea County, New Mexico.***	**No-Action Alternative:** ***The proposed NEF would not be constructed, operated and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Waste Management	SMALL. Solid wastes would be generated during construction and operations. Existing disposal facilities would have the capacity to dispose of the nonhazardous solid wastes. The proposed NEF would implement waste management programs to minimize waste generation and promote recycling where appropriate. In particular, impacts to the Lea County landfill would be SMALL. There would be enough existing national capacity to accept the low-level radioactive waste that could be generated at the proposed NEF. SMALL to MODERATE for temporary storage of the UBCs. Public and occupational exposures would be monitored and controlled. Shipment of the DUF_6 would extend operations of the DOE conversion facilities, thus extending their impacts as described in their NEPA documentation. Construction of a new privately owned conversion facility, whether adjacent to the proposed NEF or potentially near Metropolis, Illinois, would have comparable impacts to the DOE conversion facilities and proposed NEF.	SMALL. Under the no-action alternative, new wastes including sanitary, hazardous, low-level radioactive wastes, or mixed wastes would not be generated that would require disposition. The existing activities such as enrichment services from existing uranium enrichment facilities, from foreign sources, and from the “Megatons to Megawatts” program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities in the future could be constructed. Depending on the construction methods and design of these facilities, the likely waste management impacts would be similar to the proposed action.

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